An Examination of an Inſcription on a Barn in Kent; *the Mantle Tree in the Parſonage Houſe at* Helmdon *in* Northamptonſhire, *as deſcribed by the Profeſſors* Wallis *and* Ward, *reviſed; and Queries and Remarks on the general Uſe of Arabic Numerals in* England. *In a Letter from the Rev.* Samuel Denne, F. A. S. *to* Richard Gough, *Eſq.*

Read Feb. 23; March 23, 30; May, 11, 18, and 25.

BY the kindneſs of the Rev. Peter Raſhleigh I have it in my power to convey to you drawings, of inſcriptions and ſhields of arms placed in the walls of buildings that are appendages to Preſton Hall in Aylesford; and they will afford me an opportunity of ſatisfying you that the date on one of them was without ſufficient grounds advanced in the hypothetical controverſy reſpecting the time of the introduction of Arabic Numerals into this country.

N° 1, (Pl. XII. fig. 5,) is on a window-frame of ſtone at the north end of a very large barn. There is an engraving of it in Mr. Haſted's Hiſtory of Kent[*a*], and you will perceive (as, after inſpecting the original, I hinted to you in a former letter) that in the Plate, o is not ſo near the centre of 2 as it ought to have been; but he is perfectly right in the ſuggeſtion that o was the character

[*a*] Vol. II. p. 175.

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deſigned, there not being any reaſon to ſuppoſe that it was 6 or 9, and that a part had been obliterated.

N° 2, (Pl. XII. fig. 4,) is drawn from the impoſt of a door-caſe ſtopped up, in a building ſituated in a field not far from the barn. Mr. Haſted ſtyles it an *out*houſe, an error of the preſs, as I imagine, for *oaſt*houſe, becauſe when he ſaw it it was uſed for drying hops. He might alſo have given a fac ſimile of this inſcription as corroborative of his opinion that 1102 muſt be the date meant, there not being any room for the ſmalleſt addition to 0 or to 1 that immediately precedes the cypher; though ſome have thought that the ſecond unit might be deſigned for 5, and you ſeem inclined to believe it denotes 3. The inſcription on the oaſthouſe, as it appears to me, was the more eligible of the two for a Plate, becauſe T. C. is twice carved; once with the ſhield that has on it the arms of *Colepeper* only, and again with a ſhield on which the ſame coat is quartered with the arms of *Hardreſhull*.

T. C. are unqueſtionably the initials of *Thomas Colepeper*; and it is obſerved by Mr. Haſted, that there was no perſon of thoſe names poſſeſſed of Preſton Hall between "Thomas Colepeper, ſon of John Colepeper, who about the middle of the reign of Edward III. married Elizabeth, daughter and heir of ſir John Hardreſhull, and who was therefore the firſt who could uſe the arms of Hardreſhull quartered with his own, and Thomas Colepeper who died ſeized of this eſtate in 1587 [*b*]."

[*b*] Vol. II. p. 174. Mr. Haſted notices ſir John Hardreſhull as being of Hardreſhull in the county of Warwick. He was alſo poſſeſſed of the manor of Aſhene in Aſhton, in Northamptonſhire, which came to ſir Thomas Colepeper, ſon of John Colepeper, who married Elizabeth Hardreſhull. Sir John was buried in Aſhton church. In Bridges's Hiſtory of Northamptonſhire there is a plate of his monument, and in the inſcription on it he is called Harteſhull. (Hiſt. V. I. p. 283, &c.) Sir John Colepeper, probably a deſcendant of ſir Thomas, was high ſheriff of Northamptonſhire in the reign of Henry VI.

Certain

Certain it is that in the reign of Edward the IIId there was a Thomas Colepeper reſident at Preſton Hall; but in the other parts of the ſentence which I have cited Mr. Haſted did not attend to his notes of the family, made, as he ſays, from a large MS. pedigree he had of the ſeveral branches of it, from a viſitation of the county of Kent in 1626, and from other MSS. in his poſſeſſion. From theſe documents it is evident [*c*] that Thomas Colepeper of Preſton Hall was the ſon of Walter Colepeper, who died in the laſt year of the reign of Edward the IInd, ſeized, as it is recorded in the inquiſition taken after his death, of eſtates in Langley, Boughton, Eaſt and Weſt Farleigh, Yalding, Malling, Brenchley, and Shipborne. Joane was the chriſtian name of the wife of Walter Colepeper, and by her he had three ſons. Thomas, the eldeſt, was of Preſton Hall, and he dying without iſſue, the eſtate paſſed to his next brother ſir Jeffery, who lived at Preſton Hall, and was ſheriff of Kent in the 39th and 43d years of Edward the IIId, and he was the anceſtor of the Colepepers, baronets, of Preſton Hall. But Thomas Colepeper, ſon of John Colepeper, who married Elizabeth, heireſs of ſir John Hardreſhull, ſucceeded his father in the manor of Bayhall in Pembury, and there kept his ſhrievalty in the 17th and 18th years of king Richard the IInd. Nor can I collect from any part of the pedigree, as detailed by Mr. Haſted, that there could have been reſident in Preſton Hall any male deſcendant from the Colepepers of Bayhall, who, as ſuch, could have any pretenſion to the arms of Hardreſhull. The claim, as I conceive, muſt have been founded on the marriage of Thomas Colepeper, who died in 1587, with Margaret Colepeper, daughter of Thomas Colepeper of Bedgbury in Goudherſt, who was lineally deſcended from the Colepepers of Bayhall, and if ſo, their ſon Thomas Colepeper, who ſucceeded

[*c*] Haſted's Kent, V. II. p. 174.

his father at Preſton Hall, and died in 1602, had a right to quarter the arms of Hardreſhull with his paternal coat. Viewing the inſcription on the oaſthouſe in this light, T. C. with the Colepeper arms ſingle might have reference to the father, and the other T. C. with the ſhield quartered, to the ſon. The ſtyle of ſtructure of the oaſthouſe is conformable to the buildings of that age, and the ſame obſervation will apply to the barn.

Under a notion that the figures on the window-caſe were competent evidence of an earlier introduction of Arabic numerals into this country than had been hitherto ſuppoſed, a far greater antiquity has been imputed to the barn than an examination of it will warrant. Dr. Harris, indeed, only terms it an antient barn [*d*]; but as he at the ſame time averred that the date aſcertains the then uſe of the common figures in Kent, ſuch a poſitive aſſertion implied a belief of his having thought that ſome part of the barn at leaſt might be of that age. And though Mr. Haſted obſerves that the quartered ſhield of arms proves this date to have been put up ſubſequent to the year 1300, yet by ſtyling it a ſtone building he wiſhed to have it underſtood that it was older than it really is; and the draughtſman he employed has countenanced the deception, by exhibiting the frame as ſet in a ſtone-wall.

In the bird's eye view given of this ſeat and its environs by Harris, there is ſuch a repreſentation of the barn as muſt have convinced the doctor, had he attended to it, that his notion of its very high antiquity was erroneous; and I ſuſpect, that the barn itſelf was not cloſely inſpected by either hiſtorian, as will appear from the following deſcription of it.

The ſide walls of the northern bay are conſtructed with ſtone to the height of about ſix feet and nine inches, but along the other

[*d*] Harris's Hiſtory of Kent, p. 32.

bays

bays the height is gradually leſſened; and near the ſouth end there is a very low underpinning of ſtone, and above the ſtone work to the eaves the ſides are boarded. The ſouth end of the barn, almoſt from the ground, is of brick, and was not ever covered with plaiſter as it is diſplayed in the view. In this wall there is a ſtone-window frame that I think never had on it any inſcription or armorial ſhield. In the plan, by an overſight, the numeral figures are ſet in this wall, whereas they are in the north end wall, which is of brick, raiſed upon rag-ſtones of the height of ſix feet, and the four corners of the barn have coigns of ſtone of the ſame kind. The oaſthouſe is entirely of brick, except that there are ſtone coigns at the corners. This building is of workmanſhip not inelegant, and were it viewed by a ſurveyor converſant in antient architecture, I am aſſured he would not fix its age before the end of the ſixteenth century. But its being conſtructed with brick ſubverts the preſumption of its being coeval with the date of the year inſculped upon it.

What can be the ſignification of this date is then the queſtion? And Mr. Haſted's anſwer is, that it denotes either the time when the Colepepers came into this county, or perhaps that of their ſettling at Preſton-Hall. The latter appears to me to be the more plauſible ſurmiſe, though I apprehend it will ever remain deſtitute of proof poſitive, as the name of Colepeper has not been found in any writing previous to the reign of king John. This is advanced on the authority of Philipott, who, in Villare Cantianum, obſerves, that "the firſt of the family whom he found eminent in record was Thomas de Colepeper, who, as appears in the bundle of incertain years in the pipe-office, was one of the *Recognitores* [e] *magnæ Aſſizæ* in

[e] *Recognitores magnæ Aſſizæ.* Both Philipott and Haſted miſtook the province of *Recognitores.* "It was," remarks the former, (Villare Cantianum, p. 271) "a place of

in that prince's reign." But the citation is ſo looſe that it cannot be deduced from it, where the perſon named diſcharged this office of a juror, or where he reſided. The anecdote is related by Philipott in his account of Bayhall Manor in Pembury, and by Haſted under the manor of Preſton and Allington.

To Thomas Colepeper, by whoſe direction the numerals 1102 were affixed to the barn and oaſthouſe, ſuppoſing them to ſpecify a year (and they can hardly be otherwiſe conſtrued) they muſt have marked what he deemed an important era in his family; for before my late excellent friend Dr. Joſeph Milner improved this ſeat, and took down a high wall that was in the front of it, there were two more inſcriptions bearing the ſame date. One of them, as mentioned by Mr. Haſted, was on a chimney, the other, as noticed by Dr. Harris, on an old ſtone-portal on the left hand of the gate. And if the family had really inhabited this manſion five hundred years, it is not in the leaſt ſurpriſing that a deſcendant ſhould be ſolicitous to thus perpetuate ſo memorable an event. And ſhould it have been his intention to appriſe the many Colepeper plants which had long flouriſhed in different parts of Kent that they were ſcyons from the Preſton Hall ſtem, it was a ſpice of vanity that was excuſable.

As the name of Colepeper does not occur in Domeſday book, it ought not to be inferred that any of the family held lands in Ayleſ-

of eminent truſt and concernment, if we conſider the meridian of thoſe times for which it was calculated, that is before the eſtabliſhment of *conſervators of the peace*." "And," obſerves the latter, "the *Judges of the Great Aſſize* held an office of no ſmall account in thoſe times." The *Recognitores*, however, were only *jurors*, and their inqueſt was not of a criminal, but civil kind; for the ſtatute of king Henry the IInd, called *Aſſiza* by Glanville, ordained, that under the direction of the *juſtices itinerant*, twelve good and lawful men, ſworn to ſpeak the truth, ſhould make *recognition* whether a man died ſeized of land, concerning which any doubt had ariſen, and likewiſe *de novis diſſeiſinis*. (Reeves's Hiſtory of the Engliſh Law, V. I. p. p. 54, 56. 8vo edit.)

ford

ford when that ſurvey was made; but there is not any thing improbable in the ſuppoſition that a parcel of the lands therein deſcribed as being in the crown might be very ſoon after granted to one of them; and it is indiſputable that lands were long enjoyed by them under the denomination of the Manor of Preſton and Allington. With reſpect to the royal manor of Aylesford, a tenure by antient demeſne that was purchaſed in the ſecond year of king James the Iſt, by the ſir Thomas Colepeper, of whoſe names the letters in the inſcriptions are the initials. But be the ſurmiſe well founded or groundleſs, that the inſcription is commemorative of a family epoch, the figures themſelves will not caſt a ray of light on the introduction of Arabic numerals, as the ſculptor would clearly give a preference to figures that were moſt convenient, and moſt in uſe at the time he was employed; nor can there be any reaſonable doubt of the buildings not being erected before the cloſe of the ſixteenth century.

Particularities in the materials of buildings, and in their ſtyle of ſtructure, might be found to operate as forcibly againſt other dates imagined to be of very high antiquity, had the edifices on which they are exhibited been carefully ſurveyed. Of this opinion was biſhop Lyttelton, who, in a Diſſertation on the Antiquity of Brick Buildings, thus expreſſed his ſentiments. "Our very worthy and learned brother, D^r. Ward, in his ingenious remarks on Arabian Numerals, impreſſed in Relievo on a brick building at Shalford in Bucks, has ſatisfactorily proved that the date could not be 1182, as was ſuppoſed, but rather 1382. He founds his objection upon the Arabian or Indian numerals being of later introduction into this part of Europe than the twelfth century. But had he known that the oldeſt brick building here (poſterior to the Roman government) reached not higher than the cloſe of the fourteenth century, this alone would have been a very ſtrong argument againſt the ſuppoſed

poſed antiquity of the Shalford date [*f*]." And poſſibly theſe figures might have admitted of another amendment, viz. of 1582 for 1382. Mr. North, in his letter to the earl of Morton having juſtly obſerved, that, " in deeds of the reign of Elizabeth the figure 5 is frequently ſo like the figure 3 as to make a recourſe to the other part of the deed neceſſary to aſcertain it [*g*]." And all will allow that in ſculptured inſcriptions there is likely to be greater difficulty in decyphering the figure.

A miſconception of the dates in which ſome Arabian numerals are clearly diſcernible, has occaſioned much perplexity; and to me it appears very, very dubious, whether the date on the mantle-tree of the chimney in the Rectory-houſe of Helmdon in the county of Northampton, has not hitherto been miſread. The fame of this mantle-tree extended from England to Germany, from Oxford to Wirtemberg [*h*]; and I chooſe to refer to it, becauſe it was the firſt inſcription brought forward in the controverſy. Dr. Wallis communicated his ſentiments upon it to the Royal Society, and with his paper was exhibited a drawing of the whole mantle-piece, of which there is an engraving in the Philoſophical Tranſactions [*i*]. With the hope of rendering what I have to offer upon the ſubject the more eaſily underſtood, my ingenious and obliging neighbour, Mr. Peete of Dartford, has furniſhed me with the encloſed fac ſimile of this engraving, as alſo with a copy of the engraving of

[*f*] Archaeologia, V. I. p. 140. For the opinion of Dr. Ward there is a reference to Philoſophical Tranſactions abridged, V. X. p. 1265.

[*g*] Archaeologia, V. X. p. 370.

[*h*] De characteribus numerorum vulgaribus et eorum ætatibus, &c. A Joanne Friderico Weidlero, et M. Georgio Weidlero—Witembergiæ, 1727. p. 14. An account of this Diſſertation was publiſhed in the Philoſophical Tranſactions, V. XLIII. Art. I. N° 474. It was communicated to the Royal Society by Profeſſor Ward.

[*i*] Ibid. Vol. XIII. N° 154. The ſame Plate is alſo publiſhed in his Treatiſe of Algebra.

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the inſcription from a drawing made in conformity to Profeſſor Ward's idea of it [*k*].

In Dr. Wallis's letter to Dr. Plot he writes—" I have given you this particular account of the mantle-tree, and cauſed it to be exactly delineated, that upon the whole matter you may ſee how little reaſon there is to ſuſpect any thing of forgery and impoſture." That the Doctor had not any intention to deceive the Royal Society I am fully perſuaded, though not equally ſatisfied of the exactneſs of the drawing. Or if it be a fac ſimile, there is a part of the inſcription which ſhall be by and by noticed, that might not, as I apprehend, be accurately carved.

Notwithſtanding the avowed particularity of Dr. Wallis's account, he neglected to mention the kind of manſion and room in which he met with this ornamented mantle-piece, a point that deſerved ſome regard. For ſuppoſing the parlour to have been coeval with the date of the year that the Arabic numerals 1133 import, it is an older room than Weſtminſter Hall; and if the whole building was of the ſame era, Helmdon Parſonage is probably far more antient than any other rectory-houſe in the kingdom. But if, which is the only probable ſuppoſition, the edifice had been rebuilt again and again, and had likewiſe undergone many repairs in the courſe of five centuries and a half, does it not ſomewhat border on the marvellous that all the workmen employed ſhould have been ſo extremely careful as not to have in the leaſt injured this relic of antiquity? for the Doctor appriſes us " that he did not remember any other defacing than a late paring off of one letter with a knife, by a perſon whom curioſity prompted to ſee the colour of the wood underneath."

[*k*] Philoſophical Tranſactions, V. XXXII. Tab. II. Fig. 2. See alſo V. XXXIX. N° 439, p. 127.

The inſcription is thus read by him—*M*° *Dom*ⁱ *An*° 133; but Profeſſor Ward, on a cloſer examination (and poſſibly under a preposſeſſion that Dr. Wallis had aſſigned too early a period for the introduction of Arabic numerals) thinks, that one of the characters had been miſunderſtood, and that it ought to be 1233. What had been taken for the ſecond 1 being really 2 will not, however, on inſpection of the fac ſimile, ſatisfy an unbiaſſed perſon that an error muſt not alſo be imputed to the Profeſſor, and that what Dr. Wallis took for 1, and Dr. Ward for 2, is the further ſtroke of the ſecond *n* in the abbreviated word anno. And this being granted, the character to denote the century muſt be ſought for elſewhere. The *M* for 1000 they both allowed to be on the pannel in which the inſcription begins, and what place more proper for the character which marked the hundreds? though, as before hinted, either from a want of expertneſs in the ſculptor, or of accuracy in the delineator, it is not eaſy to decypher the figure annexed. Take the whole for one character and it will make an M very uncouth, and perhaps an unique [*l*]; but let the ſecond have been a character denoting 5, the obſcurity will leſſen, and the date alluded to would be 1533. To the adding of Arabian figures to Roman numerals neither of theſe learned profeſſors made any objection, they having met with the ſame mixture of characters in MSS. And I will produce a ſpecimen from a monumental inſcription which will warrant this reading of the Helmdon date. It is in the church of Stamford in the ſame county, and on a ſtone commemorative of ſir John Cave. According to Bridges it is thus inſculped—*Ann*° *D*ⁿⁱ *M*ⁱ *D*ⁱ 58 [*m*].

[*l*] In the Diſſertation of the Weidlers already mentioned are theſe words. Quæ (inſcriptio) in laterculo noſtro Figura I. exhibetur. But M is not a fac ſimile of the figure or figures in the Plate communicated by Dr. Wallis.

[*m*] Bridges's Hiſt. of Northamptonſhire, V. I. p. 582.

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Between this inſcription and the Helmdon date there is this difference, that in the latter the numerals for the tens and ſmaller figure are placed at a diſtance from the other characters. There ſeems, however, to have been a ſtudied conceit and quaintneſs in arranging the inſcription, brief as it is. I cannot refer to any other inſcription in which the word *Dom^i* is ſet before *anno*; and here it might be ſo placed under an opinion that the numerals for one year only would more aptly follow *ann^o*. And it is well known that the learned in that age were pleaſed with ſuch a jingle in the termination of words as would be occaſioned by *Milleſimo, Quinquageſimo, Domini, Anno, triceſimo, tertio.*

It was a rule laid down by Profeſſor Ward that any coin, inſcription, or manuſcript, with a ſuppoſed date before the thirteenth century expreſſed in Arabic figures, may juſtly be ſuſpected either not to be genuine, or not truly read, unleſs the antiquity of it be certain from other clear and undoubted circumſtances, and that the date will bear no other reading; and if it be a copy, that it be taken with exactneſs. In ſupport, therefore, of the doubts I have ſuggeſted on his mode of reading the Helmdon date, I ſhall by this rule be warranted to remark, that ſo far from the imputed antiquity of it being evident from other unqueſtionable circumſtances, the form of the chimney-piece and its embelliſhments ſeem to betray an anachroniſm, by exhibiting marks of a later period than the thirteenth century.

Dr. Wallis obſerved that in one half of the front of the mantle-tree there is a dragon with wings, and on the other half three panels with the date. Three other panels having on them what he termed a flower, and a ſingle panel that had two letters within an eſcutcheon. In my opinion there is beſides on the dexter diviſion one particular, though not noticed by him, far more likely, as it is there placed, to have occurred to a mechanic of the ſixteenth than

of an earlier century; and on the finiſter diviſion there is likewiſe, as I apprehend, a particular which will eſtabliſh the date of the year I have mentioned.

A dragon volant is not indeed any novel object; you find it often ſculptured from the times of the Saxons to the preſent days. It was not only the device on the royal ſtandard of Weſſex, but a biſhop had conducted armies under it [*n*]. On a Saxon arch in Ditton church in Bucks, under the inſcription is a winged-dragon with a fiſh's tail, opening its mouth at an angel [*o*]. St. George is frequently diſplayed on horſeback trampling on a dragon, and the figure of Martin, abbot of Peterborough, who died in 1158, treads on a double dragon, who bites the pillars of the flowered arch of the canopy of his tombſtone [*p*]; and you have obſerved that a dragon is ſometimes pierced by the croſier of a biſhop in his pontificals.

In later days, however, this animal was again elevated from a poſture ſo humiliated and ſubdued. By the command of Henry the IIId, a dragon, in the manner of a ſtandard of red ſamet, embroidered and otherwiſe richly adorned, was placed in Weſtminſter abbey [*q*]. And in the family picture of Henry the Vth, which was the altar piece of his chapel at Shene, there was a red dragon flying in the air. One of the banners which Henry the VIIth ſet up in Boſworth Field had painted on it a red dragon, in alluſion to his deſcent from Cadwallader. When he arrived in London he offered it in St. Paul's cathedral as a trophy of his victory, and in commemoration of the ſame he inſtituted the office of Dragon Purſuivant. King Henry the VIIIth bore his arms at firſt ſupported on the dexter ſide by a red dragon, and in the middle of his

[*n*] Archaeologia, V. IV. p. 51.
[*o*] Ibid. V. X. p. 168.
[*p*] Sepulchral Monuments, I. p. 24. Archaeologia, V. III. p. 225.

reign he transferred the dragon to the ſiniſter ſide. It may be preſumed that it was from the partiality the king had to this badge that the dragon is ſo frequently diſplayed in the picture at Windſor Caſtle, repreſenting the interview between the Engliſh and French monarchs; and as ſir Joſeph Ayloffe in his deſcription ſuggeſts, it was probably from this circumſtance there is ſeen on the top of the picture the figure of a dragon flying in the air over the Engliſh cavalcade. But in the ſculpture under examination there is one object not noticed by Dr. Wallis that yet ſeems to have a connexion with the dragon volant, and, as already intimated, it will better correſpond with the age of Henry the VIIIth, than with the age of either Henry the Iſt or IIId; and that is the *fleur de liz* neatly carved, at leaſt neatly engraved.

We may, it is true, obſerve this device in the crown of the firſt Henry[*r*], and a few other repreſentations of it may likewiſe be traced; but it was not till the cruſade of 1090 that even the king of France introduced the fleur de liz into his armorial ſhield; nor was it before the reign of our Edward the IIId that it had a place in the royal arms of England. From that time the diſplay of it became frequent. I ſhall, however, only mention what I think cannot be deemed irrelative to the notion I have advanced, that in the Windſor picture, where there are four beaſts ſupporting in their paws banners of the king's badges, one is a dragon bearing up a vane azure charged with a fleur de liz.

Let us now take a view of the ſiniſter diviſion of the mantle-tree, and particularly of the ſhield bearing two capital letters, imagined by Dr. Wallis (and I concur in his opinion) to denote the initials of the names of the then rector of Helmdon. Probable is it, that not having a pretenſion to a coat of arms, he might thus mark

[*r*] Sepulchral Monuments, I. Pref.

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the eſcutcheon; and his having a ſurname is a diſtinction that ought to be attended to. For in the twelfth century how few of the inferior clergy had a ſurname; and in the next century *de* was commonly inſerted between the two names, of which the latter alluded to the place of birth, or to a place or object choſen for a peculiar reaſon. There is ſcarcely a liſt of parochial incumbents in Bridges's Hiſtory of Northamptonſhire that will not verify this obſervation, but it will be ſufficient to examine that at Helmdon[s].

From 1283 to 1350 are entered nine rectors, and every one of them has *de* prefixed to the ſurname. *Walter de Kaucia* being the firſt of them, I was led to ſearch whether the ſecond letter on the ſhield might not have been deſigned for *K*, but it is clearly *R*; and as he vacated the living in 1283, he could not have been incumbent in 1133, and not likely to have been ſo in 1233. To not one of the ſix following incumbents will the letters apply, nor to the next, William Buncke Reede, there being two chriſtian names prefixed, and he being rector from 1409 to 1414. The twelve ſucceeding rectors muſt alſo be ſet aſide; but as Mag. Will. Renalde, A. M. the twenty-ninth rector, was inſtituted in 1523, only ten years previous to the date I have allotted to this inſcription, it ſo exactly tallies as to render it moſt probable that he was the rector who adopted this mode of informing thoſe who came after him that they were obliged to him for this handſome decoration of their parlour-chimney. Concerning the embelliſhments on the other ſhields, termed by Dr. Wallis a flower, I have not a ſurmiſe to offer, not having met with a figure exactly ſimilar, though this may be known to perſons converſant in architectural ornaments.

By way of contraſt I will recommend it to you to examine with the encloſed drawings an engraving in the Gentleman's Ma-

[s] Bridges's Hiſtory, V. I. p. 174.

gazine

gazine [*t*] of a curious ancient barn at Calcot in the pariſh of Newington Bagpath in the county of Glouceſter, that has on its porch an inſcription noticing its being built in the year 1300. In an end wall of this barn there is a window that plainly exhibits a coetaneous mark, there being ſo many windows of that pattern ſtill diſcoverable in churches of the ſame age. A ſearch will be fruitleſs in buildings of an earlier age for a window framed after a model reſembling that of the Preſton Hall barn. The characters on the Calcot barn, both letters and numerals, are alſo coeval; not ſo 3, 3, in the Helmdon inſcription, with the form of that figure in the twelfth century, and an unequivocal inſcription carved on ſtone in Arabic figures previous to the fifteenth century, I ſuſpect, may be ſtill a deſideratum. Mr. North and others have proved that many of the ſpecimens produced will not ſtand the teſt; and even Profeſſor Ward allows that ſome which were conſidered as numerals were really letters ſpecifying initials or abbreviations of names.

Mr. North, in his letter to the earl of Morton [*u*] already cited, ventured to foretell that a different account from that ſuggeſted in the Philoſophical Tranſactions would hereafter appear, if the original piece of wood remained at Helmdon Parſonage undefaced. Though not apprized of this circumſtance, I have attempted to fulfil in part this prediction on a cloſer view of the delineation and deſcription given by Dr. Wallis, who had ſeen the mantle-tree; and ſhould it have been preſerved a century beyond his time, it is to be wiſhed that it may be re-examined. But if the reaſons adduced will warrant my reading of the date, the principal baſis on which the hypotheſis of a very priſtine introduction of Arabic numerals is built muſt be ſo much weakened, that it will be extremely difficult to find any ſubſtantial proofs to uphold it; none aſſuredly from

[*t*] For the Year 1795, May. Pl. III.

[*u*] Archaeologia, V. X. p. 371.

the Preſton Hall date, though Dr. Harris, in aid of a premature concluſion, has cited with a degree of confidence the numbering of the leaves of the famous Textus Roffenſi in Arabic figures; for, as he alledges, " they are, by appearance, of the ſame age with the Textus itſelf, and that, if ſo, they aſcertain the uſe of theſe numeral figures in Kent thirty-one years before the time aſſigned by Dr. Wallis, becauſe it was probable that biſhop Ernulf, the compiler of the greateſt part of this ancient MS. finiſhed it about the year 1120 [*w*]."

Harris does not, however, ſeem to have been aware of the very great improbability of his ſurmiſe, that Ernulf ſhould have been ſo fully acquainted with the force and convenience of theſe figures, as to have applied them for the purpoſe ſuggeſted, and yet that not a ſingle Arabic figure ſhould, by accident, have ſlipt from his pen into the body of the work, though the compiler has ſpecified the dates of the years recorded, together with the value of many of the donations to his church, and of other articles poſſeſſed by the priory; and in ſeveral of the pages the inſertion of theſe numerals would have ſaved the writer much time and trouble, and parchment, which was then a dear commodity [*x*]. No leſs extraordinary is it that John de Weſterham, who, after being prior of this religious houſe, was promoted to the ſee of Rocheſter early in the fourteenth century, muſt have been aſſuredly well read in the Textus, ſhould not have marked the leaves of Cuſtumale Roffenſe in like manner, and have otherwiſe availed himſelf of the uſe of

[*w*] Hiſtory of Kent, p. 32.

[*x*] Upon this conjecture of Dr. Harris, Dr. Pegge " thinks it to be a point very doubtful, ſince the numerals that appear in the book where they are often applied are always Roman, a ſtrong preſumption that theſe characters on the top of the leaves have been added ſince." An Hiſtorical Account of the Textus Roffenſis Bibliotheca Topographia Britannica, N° XXV. p. 28.

theſe

theſe figures in a work replete with numerals. This obſervation is equally pertinent to Regiſtrum Temporale Roffenſe, a MS. compiled chiefly under the direction of Hamo de Hethe, who was biſhop from 1319 to 1352. And may I not advance, without running a riſque of its being diſproved, that there is not in any epiſcopal or other eccleſiaſtical office, a regiſter of the twelfth, thirteenth, or fourteenth century, whoſe folios have contemporary marks in the vulgar figures?

This of courſe leads to an inquiry when theſe figures became general, either in arithmetical accounts or in denoting years and days; and poſſibly the reſult of an inveſtigation may be, that evidence poſitive will be wanting to prove any ſuch early uſe of them as has been inadvertently conceived by ſome perſons, and by others implicitly adopted. In my retired ſituation I am not by any means prepared to purſue this inquiry far; but it will give me pleaſure ſhould the queſtions I mean to propoſe, with not foreign ſurmiſes and remarks, ſerve as inuendos to guide others in the ſearch, who may have opportunity to examine public libraries, or more copious private collections than are within my reach.

On the imaginary era of the introduction of Arabian numerals into England the under-written verſes were quoted in the Gentleman's Magazine of the year 1783 [*y*], from the Dreme of Chaucer, line 430, et ſeq.

THE WEDDE.

" Shortly it was ſo full of beſtes
That though *Argus the noble Countour*
Yſate to rekin in his countour
And rekin with his *figures ten*,
For by the *figures newe* all ken,

[*y*] Vol. LIII. p. 406.

If they be crafty, rekin and nombre
And tell of every thing the nombre,
Yet ſhullde fail to rekin even
The wonders we met in my ſweven.

By another correſpondent in the ſame miſcellany [z] theſe lines were not thought to afford any elucidation of the ſubject, and the perſon who appealed to them was certainly incorrect in his tranſcript. Admitting, however, THE FIGURES NEWE to imply that they were not known long before Chaucer compoſed this Dreme, the queſtion is not improper, whether for more than a century afterwards there are any traces of reckoning and numbering with figures TEN by any Engliſh Argus, who was a crafty and profeſſed countour; and therefore my firſt article of inquiry ſhall be, Where is to be ſeen the oldeſt original MS. public or private, of a pecuniary account in which all the ſums received and diſburſed are entered in Arabic figures?

From what I can recollect of Madox's Hiſtory of the Exchequer, (a book which I have it not in my power to conſult) we ſhall ſearch in vain for any ſuch ancient ſtatement in any department in that office. Clear is it from the wardrobe account of king Edward the Iſt, publiſhed by the Society of Antiquaries, that all the ſums are ſpecified in Roman characters; and I have underſtood that in the like accounts of ſeveral ſucceeding princes there is not an Arabic figure to be ſeen.

Turn we then to the regiſters of monaſteries, where conſiderable ſums of money were received and paid, and the accounts kept with great exactneſs. Cuſtumale Roffenſe has been already mentioned, and a reference ſhall now be made to the ſecond volume of Decem Scriptores, in which are many items of the income and expences

[z] Vol. LIII. p. 639.

of

of the abbey of St. Auſtin at Canterbury. To theſe I may add accounts in Regiſtrum Roffenſe by Mr. Thorpe, other pages of regiſters not publiſhed by him, and the conſiſtorial and archidiaconal acts of that dioceſe; and I am much miſtaken if in any of the accounts a coeval Arabic figure will be diſcovered before the concluſion of the ſixteenth century.

Mr. Boys, who has had acceſs to all the records of Sandwich, and who, while he was writing his hiſtory of that town, and of many places connected with it, examined the books and papers with the cloſeſt attention, acquaints me that no Arabic characters occur in the accounts before the middle of the ſixteenth century; and in the old churchwardens accounts of the pariſh of Lambeth, which begin in the year 1505, there is not for ſeveral years a common figure inſerted, all the entries being in Roman characters. The churchwardens accounts of Shome, a pariſh not far from Rocheſter, are entered in Roman numerals as late as the year 1621; and yet it is obſervable, that the common figures are uſed to mark the date of the year 1556, the ſecond and third years of the reynes of Philipp and Mary, kyng and quene. For private accounts I may refer to the Northumberland Houſe Book, wherein the ſame numerals are uſed; and in the original letters publiſhed by the late ſir John Fenn, "the reſpective ſums which William Ebeſham had received for tranſcribing books for his worſchipful maſter ſir John Paſton, and what was paid about the year 1459 [*a*]," are in the ſame characters. And ſhould it be remarked that theſe are only negative proofs, the anſwer is obvious, that ſuch a ſeries of them as might be produced will preponderate, whilſt there is not, as yet, any poſitive proof to put in the oppoſite ſcale.

But as the chief evidences in ſupport of an early introduction of Arabic numerals were drawn from inſcriptions, ſome rudely executed, others mutilated, and others where the ſuppoſed figures al-

[*a*] Vol. II. p. 10, et ſeq.

luded to names not to numbers, the ſecond article of inquiry ſhall be after inſcriptions, carved, punched, or ſtamped, on ſtone, or wood, on braſs, or other metal, in which the whole date of the year is unqueſtionably given in Arabic figures. Perhaps I ſhall be thought too venturous when I ſuggeſt a belief that of the fourteenth century no ſuch inſcription, or fac ſimile, can be exhibited; and that the numbers even of the ſucceeding century will be found comparatively few. To abate the ſurpriſe that this inſinuation may at firſt excite, it ſhould be conſidered that neither in Dugdale's Hiſtory of St. Paul's Cathedral, nor in Sepulchral Monuments, is there a tomb-ſtone or tablet of the fourteenth century that bears theſe numerals. The firſt date of this kind that has, it ſeems, occurred to you, is 1858 (1454) on a braſs plate on a tomb in Ware church, in memory of Elen Cook.

In ſeveral county and more local hiſtories there are, indeed, ſundry epitaphs printed in the common figures; but I am aſſured in many inſtances, and I rather ſuſpect it to be true in all, that from negligence, or expedition and convenience, the firſt copiers of them, or the ſubſequent tranſcribers, or the printers, have made uſe of theſe figures inſtead of Roman numerals. But had the artiſts who engraved the inſcriptions on braſs plates been well acquainted with the Arabic figures, (and if in general uſe their ignorance of them is unlikely) would they not have adopted theſe characters when the ſtone, or the braſs-plate, on which they were to work was ſo ſcanty as not to allow ſufficient room for all they wiſhed to inſert? Abbreviations were almoſt always neceſſary, and we therefore find that the initials only of the Roman characters were employed; and in not a few we meet with millo, or milleſimo, for the thouſandth year, and a competent number of c^s for the centuries.

Poſſibly it may be urged, that as the epitaphs were compoſed in Latin, the numerals in that tongue were moſt ſuitable. We, however, find them in manuſcripts upon very different ſubjects, and written

written in Engliſh, and where, from the frequent recurrence of numerals, a more conciſe mode of expreſſing them would have been preferred had it been commonly known. I will refer you to the petition of the citizens of Wincheſter, anno 1450—ſic in Archaeolog. Vol. I. p. 91—to king Henry the VIth concerning the ruinous ſtate of their houſes, in which the number of houſes unoccupied were ix^{c} iiij xx and xvii, and which, when publiſhed in Archaeologia [*b*], it was judged adviſable for the eaſe of the reader to mark by the figures 997.

Another preſumptive evidence of the no general uſe of theſe numerals in marking dates, may be deduced from their not appearing on ſeals and coins till a long time after Wallis and Ward had pronounced them to have been commonly uſed. Knowing that Mr. Boys was poſſeſſed of many fac ſimiles, it was my requeſt to him that he would be pleaſed to communicate to me his ſentiments on this matter. His anſwer, in a letter to Dr. Latham, was, "I have examined every probable part of my collection of inſcriptions, and all my ſeals, and can find no inſtance of Arabic numerals before the commencement of the ſixteenth century, except on one ſeal, an impreſſion of which I ſhall ſend, becauſe I am ſolicitous to have the inſcription decyphered. It is a fine ſeal, well engraved and preſerved, and the letters plain, but I cannot appropriate it. The date is 1^{8}8^{8} (1484) the 4 being repreſented as half 8, the form then in uſe; and you are apprized that this form was continued from the middle of the fifteenth to near the middle of the ſixteenth century."

From the ſame motive that Mr. Boys ſent me the impreſſion of this ſeal I ſhall tranſmit it to you, not being able to determine to what priory it belonged; though if it be, as I much ſuſpect it is,

[*b*] Vol. I. p. 91.

a foreign

a foreign ſeal, it does not directly fall within my line of inveſtigation. In the collection of ſeals in Scotland, engraved at the expence of the Society, there is not, as I believe, a ſingle ſeal that has a date; but the Cottingham ſeal, of which there is an engraving in Vetuſta Monumenta [*c*], has a date, and the difference between the mode of marking this date and that uſed in Mr. Boys's unknown ſeal, is ſtriking. Ancient inſcriptions on monuments, as you have obſerved, are "expreſſed in a circumlocution of phraſes, or in Roman, or Romano Lombardic characters." On the Cottingham ſeal (dated A. 1322) though the inſcription is in French, Latin numerals for the hundreds and tens (cccxx) are placed between mill. and ſecounde. On the other ſeal the date is noted in four common figures; nor is it an improbable ſurmiſe, that before the introduction of Arabic numerals, dates on ſeals were ſo unfrequent, becauſe the margins would not allow room for ſo many characters as were neceſſary.

There was a ſtill greater difficulty in dating coins that were much ſmaller than moſt ſeals, and, according to ſir Martin Folkes, there was not a coin minted in England before the ſixteenth century that had the date of the year impreſſed upon it [*d*]. Snelling ſuggeſts his belief that the penny of Edward the VIth, A. 1547, is the firſt Engliſh coin that bears the date of the year, which is in Roman characters; and Folkes notices a piece ſomewhat broader than a groat of the ſame year, on which the date is thus marked, M. D. X4 7. Sic in Folkes, p. 28 [*e*]. Indeed, under the reign of Henry the VIIth he mentions a very uncommon and ſingular coin, of which the inſcription is *Mani. Tecke*4. *Phares.* 1494; but this he ſuppoſes to have been coined by the ducheſs of Burgundy for Perkin Warbeck, when he ſet out to invade England in that

[*c*] Vol. I. N° 5.
[*d*] A Table of Engliſh Silver Coins.
[*e*] Ibid. p. 28.

year [*f*]. And the ſame learned author deſcribes a groat of Henry the VIIIth ſtruck at Tournay in Flanders, that carries the date of the year 1513, when he was at that place [*g*].

From the books of our earlieſt printer, Caxton, another evidence of the no common uſe of Arabic numerals may be deduced. As far as I can collect from Tanner's catalogue of them in Bibliotheca Britannica, and from Lewis's Life of Caxton, in not one of theſe volumes is the date of the year of publication noticed in the common figures. It is alſo obſervable, that when the leaves are numbered capital letters are uſed, as they are in the ſignatures of the ſheets. The common figures which are printed in Lewis's Life of Caxton might warrant a ſuppoſition of their occurring in ſeveral parts of the books he has quoted; but I muſt own I am rather apt to ſuſpect that in this caſe, as well as in the epitaphs inſerted in the Hiſtories of Faverſham abbey and the Iſle of Tenet, he for his own convenience, when making the extracts, thus wrote them; and I think it will be readily admitted that Caxton could not have found a want of many types (if any ſuch he had) of Arabic numerals, becauſe they could ſo rarely have occurred in the MSS. which were to paſs under his preſs.

7 blended with 8, and placed between the initials of his names, was Caxton's device; and ſome have thought this cypher, as an abbreviation of 1474, might be commemorative of the year when he began printing in England. But though Caxton's books are not dated with Arabic numerals, you inform me, on the authority of Ames, that *Rhetorica Nova Gulielmi de Saona,* one of the firſt books printed at St. Alban's, has this impreſſion 14ʌ8.

Reſpecting the no general uſe of theſe figures in marking dates previous to the ſixteenth centuryone more evidence ſhall be offered;

[*f*] A Table of Engliſh Silver Coins, p. 19. [*g*] Ibid. p. 24.

and

and that is the Paſton Letters. For in the two firſt volumes of that collection I have diſcovered only one letter in which the year of our Lord is ſo noted, and I am inclined to believe this may not be a fac ſimile of the original. The letter to which I allude is in Vol. I. N° XLV. (p. 184.) of the reign of Henry VI, ſubſcribed by W. Botoner, called Wyrceſter, addreſſed to ſir John Berneye, and thus dated—" Wret at London haſtly the Monday after I departed from you 1459*x*." There are ſeveral circumſtances which render it ſuſpicious that 1459 might be a ſubſequent explanatory inſertion, not detected by the editor, attentive and accurate as he generally was. In the firſt place Botoner has not noticed the year of our Lord in his other letters; nor is there in them but one inſtance more of an Arabic numeral. This merits the more regard, becauſe in theſe letters he frequently makes uſe of the Roman capitals. I have ſubjoined the repetitions, and have alſo added copies of the dates of his other letters [*h*]. The forms of 4 and 5 ſhew it not to be a coeval date, and *x* being placed after the laſt figure, the fair concluſion is, that it had been preceded by capital letters.

Except in theſe two particulars, viz. 1459, and A° 36, Hen. VI. I have not perceived in either volume any date of year or month ſo marked. Indeed the year of our Lord is not noticed in any letter, and poſſibly the omiſſion might be often owing to the number of

[*h*] Letter XVII.—p. 76. from Bote H. R. ner to Maiſter Paſton.
———————p. 78. Wryt haſtly VIII day of June.
Letter XXXIV. p. 140.—W. Botener to Maiſter John Paſton, &c.
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capital letters that would have been requiſite for the purpoſe; and it is beſides frequently ſignified that the letters were written haſtily. The year of the king's reign, however, is often ſpecified, as alſo the day of the month, or of the ſaint neareſt to it, but always in Latin numerals.

Obſerving in Plate VI. N° 31, annexed to theſe letters, a ſpecimen of the Arabic figures which the editor ſaid were then in uſe, I expected to have ſeen many of them; but unleſs I have overlooked them, they are only to be met with in p. p. 152, 184, of Vol. the Iſt, which have been juſt examined, and in Vol. the IInd, p. p. 300, 302, on the margin of a paper with this title—" The Inventory off Englyſhe Boks of John made ye v daye of Novemb^r^ A° R. R. E. iiij." And yet there are not fewer than one hundred and fifty-five of theſe letters and papers, and all of them written in the years 1440—1486; that is, two hundred years ſubſequent to the time when Dr. Wallis imagined them to have been in common uſe. " Theſe figures," writes the Doctor [*i*], " ſeem to have come in uſe in theſe parts about the eleventh century (or rather in the tenth century, about the middle of it, if not ſooner), though ſome rather think not till the middle of the thirteenth, and it ſeems they did ſcarce come to be of common uſe till about this time."

Such, Sir, are the grounds on which I have thought myſelf warranted to controvert a notion that has long prevailed of a too early frequent uſe of the vulgar arithmetical figures; nor is it improbable that it might be the more readily acquieſced in from its having been zealouſly maintained by two very eminent profeſſors. They, however, did not coincide in their opinions reſpecting the introduction and confined uſe of Arabic numerals; for Dr. Ward

[*i*] Treatiſe of Algebra, Preface, page 2.

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capital

capital letters that would have been requiſite for the purpoſe; and it is beſides frequently ſignified that the letters were written haſtily. The year of the king's reign, however, is often ſpecified, as alſo the day of the month, or of the ſaint neareſt to it, but always in Latin numerals.

Obſerving in Plate VI. N° 31, annexed to theſe letters, a ſpecimen of the Arabic figures which the editor ſaid were then in uſe, I expected to have ſeen many of them; but unleſs I have overlooked them, they are only to be met with in p. p. 152, 184, of Vol. the Iſt, which have been juſt examined, and in Vol. the IInd, p. p. 300, 302, on the margin of a paper with this title—" The Inventory off Englyſhe Boks of John made ye v daye of Novemb^r^ A° R. R. E. iiij." And yet there are not fewer than one hundred and fifty-five of theſe letters and papers, and all of them written in the years 1440—1486; that is, two hundred years ſubſequent to the time when Dr. Wallis imagined them to have been in common uſe. " Theſe figures," writes the Doctor [*i*], " ſeem to have come in uſe in theſe parts about the eleventh century (or rather in the tenth century, about the middle of it, if not ſooner), though ſome rather think not till the middle of the thirteenth, and it ſeems they did ſcarce come to be of common uſe till about this time."

Such, Sir, are the grounds on which I have thought myſelf warranted to controvert a notion that has long prevailed of a too early frequent uſe of the vulgar arithmetical figures; nor is it improbable that it might be the more readily acquieſced in from its having been zealouſly maintained by two very eminent profeſſors. They, however, did not coincide in their opinions reſpecting the introduction and confined uſe of Arabic numerals; for Dr. Ward

[*i*] Treatiſe of Algebra, Preface, page 2.

thought no ſpecimens were to be found before the thirteenth century, and Dr. Wallis imagined they might be traced in the times of the Saxons. Manuſcripts indiſputably coetaneous muſt decide this point; and with all due ſubmiſſion to their talents, natural and acquired, when applied to other ſubjects more in their own lines of purſuit, the manuſcripts ought to be examined by perſons better converſant in this branch of antiquities than theſe learned men ſeem to have been, if a judgment may be formed of their penetration and experience from their unſucceſsful readings of inſcriptions on ſtone and wood.

Mr. North has well criticiſed Dr. Ward's expoſition of the date on the gateway near the great bridge at Cambridge [*k*]; and you have made ſome pertinent remarks on his erroneous conception of the letters in the Rumſey window, as well as on the figures on the Mantle Tree at Saffron Walden, that are more likely to have been meant for vine tendrils on the Ton, that was part of the device of the name of Mydleton [*l*]. And after what I have ſuggeſted in the foregoing pages, may I preſume to advance that Dr. Wallis's view and report of the Helmdon mantle-tree inſcription deemed by him a paramount proof of the truth of his hypotheſis, was ſuperficial and unſatisfactory?

Not long after Dr. Wallis communicated his paper to the Royal Society, he was favoured by a learned friend [*m*] with a copy of an inſcription over the great gate of the college of St. Auguſtine at Briſtol, which was concluded with theſe numerals 1170; and this

[*k*] Archaeolog. V. X. p. 372.

[*l*] Vetuſta Monumenta, Vol. II. N° 19.

[*m*] Cono-cuneus, &c. fol. 1684. Additions and Emendations, p. 153. The friend referred to was Dr. Thomas Smith, fellow of Magdalen college in Oxford (a reverend and learned perſon, and a curious obſerver of antiquities, both at home and in foreign countries, as far as Greece and Turkey).

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was his comment—" Where inſtead of 4 we have the ſame figure reverſed; but either of them doth equally agree to what was the old ſhape of this figure $\bar{X}$. And the difference of it from what we now uſe, doth rather confirm the antiquity than give us any cauſe to doubt of its being genuine. And this inſcription being but ſeven years later than that on the mantle tree (at Helmdon), they do mutually confirm each other." But beſides that there does not appear to be any reſemblance between the 4 proper or reverſed, and $\bar{X}$, the then exiſtence of any ſuch date added to the inſcription, is queſtionable.

In the ſame page of his Additions and Emendations Dr. Wallis has cited a book printed at Hamburgh in 1614, to ſhew that a mixture of Latin numerals and Arabic figures cannot ſeem ſtrange. But the firſt book that was printed would not be admiſſible evidence in this caſe, without authenticating the date of the MS. from which it was printed, and this the doctor had allowed, as will appear from the annexed extracts, whilſt he was remarking on a MS. of Boethius, and on an ancient MS. treatiſe of eccleſiaſtical computation [*n*].

By

[*n*] Treatiſe of Algebra, p. 9. " I know that in the editions which we now have of Boetius, Bede, and other ancient authors, theſe figures are now frequently uſed: but I do not believe they were found in the ancient manuſcript copies from whence theſe printed copies were taken; but, in thoſe, all their numbers were expreſſed by the Latin numeral letters (and in divers ancient manuſcripts I have ſo ſeen it), and therefore I do not bring thoſe as an argument of their antiquity, nor do I believe they were in uſe (in theſe weſtern parts) when theſe authors were firſt written." I find theſe figures alſo uſed in an ancient treatiſe of eccleſiaſtical computation, in verſe, called Maſſe Computi, of which I have ſeen divers copies in MS. and I think it is alſo printed, which he ſays was written in 1200. But though we may from hence gather the age of this work to have been about the year 1200, yet I confeſs it doth not from hence follow certainly that they were then in uſe; however, we now find them in ſome of thoſe copies which we have, for it is poſſible that in the firſt original, the numbers here

By the ſeveral perſons who engaged in the controverſy it was agreed that the Arabic figures were firſt uſed in this country in aſtronomical tables and other mathematical writings; and, ſays Dr. Wallis, it was by little and little they came into common uſe, and common practice [*o*]; but, as already obſerved, he fixes this common uſe to the thirteenth century, though it is undeniable there is a want of evidence to aſcertain this practice either in the two firſt rules of arithmetic, or in ſpecifying dates and other particulars that required numeration. Had a country mechanic in the tenth century been in the habit of noting the year of building a tower or a gate, it is ſcarcely credible that theſe figures ſo applied ſhould not have been found in ſome part of every manuſcript that recorded the foundation and endowment of a monaſtery. And if, as the lines cited from Chaucer's Dreme may import, theſe figures then newe, were uſed in addition and ſubſtraction towards the end of

as well as in Bede's books, de computo, might be deſigned in numeral letters, and ſo in one copy I find it to be. But in others, the numbers are deſigned by the numeral figures, and (theſe appearing otherwiſe to have been in uſe at that time) we may as well think, they were ſo uſed in this, yet ſo as that the numeral letters were in uſe alſo, as even to this day they are. Ibid. p. 11, 12.

[*o*] Ibid. p. 9. "As to the time when theſe numeral figures began firſt to be in uſe amongſt us, Voſſius tells us that they have not been in uſe above 350 years, at leaſt not 400 years at the utmoſt—i. e. they were not in uſe till the year 1300, or at fartheſt before 1250. But I take them to be ſomewhat more ancient than ſo, not in common uſe, but at leaſt in aſtronomical tables, which we tranſcribed from the Moors or Arabs, and afterwards by degrees came into common uſe, till at length they became generally uſed in all arithmetical computations, as being much more convenient for that, than otherways of deſigning numbers."——"Upon the whole matter, therefore, I judge that about the middle of the eleventh century, or between the year of our Lord 1000 and 1100, theſe figures came into uſe amongſt us in Europe, together with other Arabic learning, firſt on the account of aſtronomical tables and other mathematical books, and then by little and little into common practice." Ibid. p. 13, 14.

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the fourteenth century, it is ſufficiently ſtrange, though perhaps not quite unaccountable, that ſuch a mode of reckoning ſhould not ſooner have been more general. The perplexity and tedioufneſs of working Roman capitals to a perſon of an unretentive memory will appear on an examination of ſeveral of the ſums printed from Cuſtumale Roffenſe, in which there are long ſtrings of ſhillings and pence in the ſame column, that not many could caſt up exactly without the aſſiſtance of pen and paper; or, as the clown in the play acknowledged, without counters [*p*]. And, though there was an improvement in the ſtatements of accounts by ranging the pounds, ſhillings, and pence, in different columns [*q*], yet ſtill in long and intricate ſums it was admitted by a maſter of arithmetic in the middle of the ſixteenth century, that the "feat with the counters would not only ſerve for them that cannot write and read, but alſo for them that can do both, but have not at ſome time their pen or tables ready with them [*r*]."

I am not aware that any reaſon has been aſſigned for the very ſlow progreſs in the practice with Arabian numerals, for upwards of a hundred years after they were certainly known in this country. May it not, however, be attributed, partly to the general ſtate of knowledge and literature in the fifteenth century, partly to a pertinacious adherence to old habits and forms, which is not uncommon even in more enlightened times; and perhaps, a little to pecuniary motives? Frequently has it been obſerved, and with truth,

[*p*] The Winter's Tale, Act IV. Scene III. "Clown. Let me ſee, every eleven weather tods, every tod yields——pounds and odd ſhillings, fifteen hundred ſhorn, what comes the wool to? I cannot do it without compters."

[*q*] It however often happened that ſhillings, amounting to pounds, were placed in the ſhilling column.

[*r*] Record's Arithmetick, 12°, 1658, p. 179.

that

that in the fifteenth century, there was in England a diſgraceful neglect of the arts and ſciences; and though we read liſts of perſons ſtyled great mathematicians and philoſophers [*s*], no diſcoveries of importance did they make, no books did they write that have been thought worthy to be perpetuated in print. In an age, therefore, ſo incurious and idle, (unleſs when in ſearch of the elixir of life that was to cure all diſeaſes, and make old people young, or of the philoſopher's ſtone, that was to tranſmute the baſer metals into fine gold or ſilver) it was not likely that ſcribes and ſcriveners ſhould be ſolicitous in their inquiries after figures newe, or willing to change the old characters they were trained to uſe, and for the writing of which they were liberally paid [*t*]; or if a more eaſy mode of reckoning was purſued, they might have their doubts whether the profits of their craft would not be leſſened by it. As late as the concluſion of the ſixteenth century the perſons employed by churchwardens to keep the pariſh accounts made uſe of Roman capitals [*u*], and in public offices all change was carefully

[*s*] "John Sommer about 1390; John Walter about 1400; William Batecombe about 1410; William Buttoner about 1460; were very eminent in other kinds of learning, and particularly in mathematics; and divers of their works are extant in our libraries, which have not been printed." Treatiſe of Algebra, p. 6.

[*t*] Paſton Letters, V. II. p. 810, Note. "We are here furniſhed with a curious account of the expences attending the tranſcribing of books, previous to the noble art of printing. At this time the common wages of a mechanic were with diet 4d. and without diet 5d. ½, or 6d. a day. We here ſee that a writer received 2d. for writing a folio leaf, three of which he could with eaſe finiſh in a day; and I ſhould think that many quick writers at that time would fill four, five, or even ſix in a day; if ſo, the pay of theſe greatly exceeded that of common handicraft men."

[*u*] "I find by our pariſh books that the churchwardens and overſeers of the poor ſtated their accounts in numeral letters till ſince the year 1600." Bibliotheca Literaria, Number VIII. p. 8. The title of the paper is, An Hiſtorical Eſſay concerning Arithmetical Figures and their uſe. But the pariſh in which the writer lived is not mentioned.

avoided,

avoided, from an apprehenſion that there might be in innovation, the ſeeds of confuſion. In the ledger books of merchants and tradeſman at the end of the fifteenth, and the beginning of the ſixteenth centuries, (ſhould there be any ſuch remaining) items of receipts and payments in the vulgar figures may be diſcovered; but I ſomewhat queſtion their being met with in any other MSS.

Printing muſt have accelerated the progreſs of Arabic numerals. By that excellent invention there would be an increaſe of ſcholars in arithmetic, and the knowledge of it attained with greater facility. Nor could the compoſitors of the preſs have had the ſame prejudices againſt theſe figures that the writers and tranſcribers of MSS. might entertain, becauſe it might affect their livelihood. A curſory view of a proof ſheet, upon which were impreſſed the ſame ſums of money in the common cyphers, and in Roman capitals, would immediately ſatisfy an impartial examiner which claſs was the more eligible.

In the middle of the ſixteenth century Robert Record, fellow of All Souls college in Oxford, and doctor of phyſic, publiſhed his perfect Work and Practice of Arithmetic. It was dedicated to king Edward the VIth, and contained two dialogues between the maſter and ſcholar, the former of them teaching the art and uſe of arithmetic with the pen, the ſecond the accounting by counters. Of this book the firſt edition in 8vo. was in 1540; the ſecond in 8vo, with Augmentations, by John Dee, in 1590; and a third, in 12mo. enlarged by John Mellis, in 1658, of which I have procured a copy. And as the dialogues are printed in black letter, it may be preſumed that all the numerals, whether letters or figures, correſpond with thoſe characters in the original edition.

Both Wallis and Ward mention their having ſeen in MSS. the Roman characters blended with Arabian figures; and it has been ſhewn that there is the like mixture in inſcriptions on monuments and coins. Record has given all his examples in common figures,

but

but his rules are illuſtrated in words, letters, and figures. Under the chapter of Numeration, page 9, he ſtates, "There are tenne figures that are uſed in arithmetick, and of thoſe tenne one doth ſignifie nothing, which is made like o, and is privately called a cypher; though all the other ſometime be likewiſe named: the other nine are called ſignifying figures, and are thus figured:

1. 2. 3. 4. 5. 6. 7. 8. 9.

And this is their value:

i. ij. iij. iiij. v. vi. vij. viij. ix."

A ſpecimen of his method of illuſtrating an example ſhall be ſubjoined in a note[*w*].

The author has not ſuggeſted a hint as to the time when, or the perſons by whom theſe figures were brought into England[*x*].

[*w*] Page 13. "A general Rule—Scholar. If I make this number 91359684, at all adventures, there are eight places. In the firſt place is 4, and betokeneth but foure; in the ſecond place is 8, and betokeneth ten times 8, that is 80; in the third place is 6, and betokeneth ſix hundred; in the fourth place 9 is nine thouſand; and 5 in the fifth place is XM times five, that is fifty M. So 3 in the ſixth place is CM times 3, that is CCCM. Then 1 in the ſeventh place is one M.M. and 9 in the eighth ten thouſand thouſand times 9 that is XCMM—i. e. (at p. 14) XC thouſand thouſand CCCLIX thouſand, 684, that is VIC.LXXX.iiij."

Fortunate is it for the clerks in the revenue department, and in the Bank and other money offices, that they are not bewildered with an accumulation of M^s D^s C^s L^s V^s X^s and I^s; and extremely would it puzzle the head of the craftieſt Argus, or bull or bear at his counter at Jonathan's, or the Stock Exchange, had he not the knowledge of figures tenne for numbering on a rencountre day his gain, or as a lame duck loſs by ſpeculating in conſols and omnium. For every age has its peculiar technical language, that antiquaries in later days find it difficult to decypher.

[*x*] Record's Arithmetick, p. 17.—"Maſter. I might ſhew you here who were the firſt inventors of this art, and the reaſon of all theſe things that I have taught you, but that I will reſerve till ye have learned over all the practice of this art, leſt I ſhould trouble you with over many things at the firſt."

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But in the preface there is an hiſtorical paragraph which I will quote, as it may be a means of tracing the uſe of theſe figures before he publiſhed what he ſtyles the Ground of Arts. "If (he writes) any man object that other books have been written of Arithmetick already ſo ſufficient that I needed not now to put pen to the book, except I will condemn other men's writings: to them I anſwer, that as I condemn no man's diligence, ſo I know that no one man can ſatisfie every man: and therefore, like as many doe eſteeme greatly other bookes, ſo I doubt not but ſome will like this my booke above any other Engliſh Arithmetick hitherto written; and namely, ſuch as ſhall lack inſtructors, for whoſe ſake I have ſo plainly ſet forth the examples, as no booke that I have ſeen hath done hitherto, which thing ſhall be great eaſe to the rude readers." The laſt article of inquiry, therefore, ſhall be after thoſe writings or books (it is not clear from the paſſage cited whether they were in manuſcript or print) to which Record alludes. And I think it is not a ſtrained inference from this treatiſe of a great arithmetician, that in his days the Arabian numerals could not have been in very common uſe, when the maſter found it requiſite to explain to his ſcholar in ſuch an heterogeneous method the force, value, and utility, of theſe now vulgar figures.

Mortifying is it as well as aſtoniſhing to obſerve the ſlow progreſs formerly made in acquiring a ſcience, a proficiency in which is now ſo eaſily obtained; for a ſtripling at a ſchool in a country village can now by the help of theſe figures in a few minutes work a ſum, that the eminent Roger Bacon could not have reckoned perhaps in a whole day with Roman capitals. And ſuch being the benefit that has accrued to people of every degree and ſtation in ſociety by this admirable diſcovery, much is it to be regretted that neither the ſagacious inventors, or Indians or Arabians, nor the introducers of it into England or Europe, ſhould be known,

notwithſtanding the aſſiduous and commendable endeavours of many learned men to reſcue their names from oblivion [*y*].

But it is high time for me to finiſh my ſurmiſes, queries, and remarks, on this ſubject. They will, I truſt, amuſe you, and tend to convince you, if not of my ability, yet of my readineſs to engage in a long taſk that reſulted from your deſiring me to examine the much talked of old date on the Preſton Hall barn. Whether what I have written may be thought of ſufficient importance to be communicated to our intelligent and reſpectable brethren at Somerſet Place, is ſubmitted to the judgment of Mr. Director, by

Dear Sir,

Your faithful

and obliged Servant,

Wilmington,
November 22, 1796. SAM. DENNE.

[*y*] See Philoſophical Tranſactions, N° 439, Article III. Some Conſiderations on the Antiquity and Uſe of the Indian Characters and Figures. By Mr. John Cope.

Additional

Additional Remarks on the Helmdon *Mantle-Tree Inſcription, and on the Knowledge and Uſe of Arabic Numerals in the Thirteenth, Fourteenth, Fifteenth, and Sixteenth Centuries. By the Rev.* Sam. Denne, F.A.S.

Read June 1, 1797.

IT was obſerved by the late Dr. Johnſon [*a*], that "of an art univerſally practiſed the firſt teacher is forgotten;" and ſtrictly applicable to this general poſition is the declaration of Mr. North, that, "though next to the art of printing there is no invention of more extenſive uſe than that of the numeral figures or cyphers, yet, when, where, and by whom they were invented, are queſtions never perhaps to be clearly anſwered [*b*]. Deſpairing, therefore, of ſucceſs in ſuch an inveſtigation, the inquiries I propoſed were limited to periods when the vulgar figures of arithmetick were certainly known in England, and my humble attempt was, and is, to mark the very ſlow progreſs made for centuries in the uſe of theſe rudiments of a ſcience, an ignorance in which is now deemed diſreputable in thoſe who have acquired other branches of a liberal education.

Reſpecting the time of the introduction of Arabic numerals into this country Dr. Wallis imagined that he had perceived traces of

[*a*] Lives of the Poets, V. II. p. 109.
[*b*] Archaeologia, V. X. p. 361.

them among our Saxon anceſtors; but he was confident that they were in uſe on ordinary occaſions before the middle of the twelfth century, from his having diſcovered on a mantle-tree in the parlour of the rectory-houſe of Helmdon in Northamptonſhire, the year 1133 manifeſtly carved. This being repeatedly averred by ſo eminent a profeſſor on his own view, and he having preſented to the Royal Society, by way of illuſtration, what he called an accurate drawing of the chimney taken by his own direction, it cannot be matter of ſurpriſe that a profeſſor of a foreign univerſity ſhould have readily acceded to it, nor that other men of learning ſhould have implicitly adopted it. And as in the two editions of Chambers's Dictionary, and in the Cyclopædia Britannica, there is not any demur to the evidence produced, it may have been generally conſidered as authentic and deciſive.

There have been, however, a few perſons to whom the notion has appeared queſtionable; and the firſt and principal objector, as it is believed, was Dr. Ward, who laboured to ſhew, that the figure ſuppoſed by Dr. Wallis to be 1 was really 2, which would occaſion an alteration to 1233. And ſince I expreſſed my doubts upon theſe two readings in my letter to Mr. Gough, he has tranſmitted to me ſome detached pages of Bibliotheca Literaria, N° X. in which periodical paper there is addreſſed to the editor by an anonymous correſpondent the underwritten paragraph, p. 35.

"The Colcheſter inſcription, as you print, ſtands thus 1090; falſified with a vengeance, for I have ſeen it, and it was originally thus 1890; i. e. 1490; ſome fantaſtical knave, perhaps as late as the era of quakers, has diminiſhed the 8 of his lower parts, and left it thus °, for it plainly appears to any diſcerning eye that the firſt o of the pretended 1090 is but half as big as the other. Being ſure in the Colcheſter inſcription, I ſhall venture a fling at the chimney (at Helmdon), which though I never ſaw, I have vehemently ſuſpected

pected ever ſince the time that I ſaw the Colcheſter one. You give it A° Doi. Mo. 133; I read M8L33; the ſame chiſel work diminiſhing the 8, and cutting off the horns of the L, which was for C, ſo that the date ſtands 1433. Who don't believe, go look, and give their opinion." Advice laconic, which, as ſhall be preſently ſhewn, has been duly followed by one incredulous gentleman.

On an attentive review of the plates, publiſhed in the Philoſophical Tranſactions, I thought I ſaw ſufficient grounds to believe that another hundred years ought to be added to the date of the inſcription; if ſo, there is a choice of four centuries in decyphering this curious relic of former times, it being ſtill a moot point whether this character, vexatiſſimus, be it placed in the firſt or third panel, were deſigned by the carver to mark or 1, or 2, or 4, or 5, though I am inclined to hope it will not be much longer a dubious matter. In my paper which has had the honour to be ſubmitted to the conſideration of the Society, I intimated that Mr. North, in his letter to the earl of Morton, had ventured to predict, that if the original piece of wood at Helmdon Parſonage, which has been a very ſphinx ever ſince it was propounded by Dr. Wallis, remains undefaced, it would be hereafter expounded in a manner different from that avowed by the learned profeſſor; and I have now the ſatisfaction to acquaint the Society that it does remain undefaced.

For this article of intelligence we are obliged to our indefatigable Director, who being apprized that the Mantle-Tree was extant, took a journey into Northamptonſhire for the purpoſe of ſurveying it. His report ſhall be delivered in his own words, accompanied with a fac ſimile of all the numeral characters, and of a part of the letters, the remainder not being within his view from a cauſe which he has aſſigned.

"In the modernization of a room (writes Mr. Gough) originally 20 feet by 12, now divided into a drawing-room and book-cloſet, the

the mantle-tree has given way to a modern chimney-piece; not by removal or abolition, but by incloſure in a ſhelf over the fire-place, removable at the pleaſure of antiquaries. By this alteration the principal parts are preſerved, though the new wainſcot trenches a little on the tops of the characters, and entirely conceals the head of the dragon, and the roſes finial. Nothing has been cut or broken off the figures, nor is any material part concealed, as the inclоſed fac ſimile will convince you. But you are to obſerve that the figure under W. R. is meant for the dragon, who is placed at the head of the whole; though not being eſſential to the inſcription, is here introduced merely to ſhew how much of him is concealed. And for the ſame reaſon the compartments of roſes are omitted.

"Mr. Ruſſell, the preſent incumbent, whoſe name is not like the ſuppoſed maker of the Parſonage mantle, William but John, is well aware of the curioſity he poſſeſſes, and not deficient in attention to the few who think it an object of inquiry, nor inſenſible to the poſſibility of its being of leſs antiquity than is generally preſumed, though he wiſhes to be convinced of the contrary propoſition. He has a copy of Dr. Wallis's account of it in MS. The rectory houſe ſhews no particular mark of antiquity in the ſtyle or building, being a ſubſtantial ſtructure of the ſtone of the country, like many of its neighbours, and not calculated to contain five or ſix children. How to make *Anno Domini* out of the two firſt compartments rather puzzles me. I ſubmit the third to you."

Suſpicious as I was that the mantle-tree plate might have been embelliſhed by the burin of the engraver, I muſt own I did not expect to find that the original was ſo rude a piece of ſculpture; and it is in this reſpect, and in this only, that it can have had any pretenſion to the very high antiquity imputed to it. One muſt conclude it to have been the workmanſhip of a country joiner, not capable with chiſel or with pen of forming a correct figure or letter; and

obvious

obvious is the remark that Dr. Wallis muſt have read the inſcription with an eye prepared to view in it Arabic numerals that ſhould ſtrengthen his favourite hypotheſis. And afterwards, he muſt have truſted to memory for what he imagined he had ſeen; for had he compared the drawing with the original, he could not have failed obſerving that there was a ſtriking diſſimilitude between them.

After repeatedly inſpecting the plates exhibited by Wallis and Ward, to me it appeared likely that they both looked for the character ſpecifying the century in the wrong compartment, and Mr. Gough's fac ſimile convinces me that I was not miſtaken. It is not, as conceived by Wallis, a ſingle character in the firſt panel, there being clearly three diſtinct characters. All, I believe, will agree the firſt of them to be deſigned for M, though it is an uncouth letter. As to the ſecond, I can only ſay that it is not more unlike 5 than the two figures in the third panel are unlike threes, and that the chiſel ſeems to have been uſed in reverting inſtead of inverting the lower extremities of theſe figures. Somewhat apt am I to think that the ſecond character might be meant for 4, and this under a notion the artiſt might have, that as L was a cuſtomary mark of fifty, by placing C a little way from the ſummit of it, it would be underſtood to ſignify 500; this C, however, adds weight to my conjecture, that as M, the firſt character is obviouſly the initial of mille, the thouſandth year, ſo the ſecond ought to be interpreted to denote the ſucceeding centuries.

Mr. Gough acknowledges himſelf to be puzzled how to make *Anno Domini* out of the fragments of the letters, though this would have been plain to him had not the wainſcot concealed the tops of them, as alſo the *i* and *o* that are viſible in the engravings. But I apprehend myſelf to be fully warranted in ſuggeſting that had it not been for the intermediate *Dᵒo* and *Anᵒn*, it would not have been an eaſy taſk to have diſcovered from ſuch pot-hooks and hangers

whether

whether the other characters were deſigned for figures or letters; for numerals or for words; and that the date of the year cannot now be aſcertained without the aid of the concomitant proofs which the other parts of the inſcription ſupply.

It was with this view that I drew attention to the dragon and fleur de lys as ſuſpicious marks of anachroniſm, certainly as being far leſs applicable to the reign of either Henry the Iſt or IIId than to the times of the eighth king Henry, to the year 1123, or 1233, than to 1533. The ornaments on the panels on each ſide of the compartment marked with the letters W. R. were from a want of information left unnoticed; but Mr. Gough has given a clue to a ſurmiſe by terming, what Dr. Wallis called flowers, roſes; and it muſt be granted that they reſemble roſes as much as they do any other flower. But, comparatively ſpeaking, how ſeldom do we find the roſe uſed as an ornament upon buildings, or as a device upon armorial ſhields and banners, before the partiſans of York and Lancaſter took a white and a red roſe for the badges of the contending houſes; and after the marriage of Henry the VIIth to the princeſs Elizabeth, daughter of king Edward the IVth, the union roſe was perpetually diſplayed. For edifices thus embelliſhed ſubſequent to the commencement of that direful quarrel I will refer to the chapel of King's College in Cambridge, and to the chapel of Henry the VIIth at the eaſt end of Weſtminſter Abbey, where are to be ſeen roſes innumerable between imperial crowns and portculliſes; and for banners charged with roſes red and white, and union, I will again mention the pictures at Windſor Caſtle, as deſcribed by ſir Joſeph Ayloffe and Mr. Topham; both of them illuſtrative of hiſtorical incidents in the year 1520; and in the latter are banners diſplaying the dragon and fleur de lys. Suppoſing therefore rector Ranalde to have planned the faſhion of this mantle-piece in 1533, the roſes may be deemed coetaneous embelliſhments. Perhaps by

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the great roſe, if of one colour only, he might ſhew the royal houſe to which he was moſt inclined, as by the double compartment with roſes he might denote their happy union under Henry the VIIIth. And William Ranalde I ſtill hold to have been the incumbent in 1533, not finding any other rector to whom the letters W. R. can be applied as initials of the names.

From an extract of the regiſter of John (Longland) biſhop of Lincoln, communicated by Mr. Fardell to Mr. Gough, it appears that William Ranalde, maſter of arts, was in 1523 admitted at Buckden to the rectory of Helmdon, on the preſentation of the maſter and brethren of the hoſpital of St. John near Northampton. But when he vacated the benefice, or whether by reſignation, ceſſion, or death, is not known. Mr. Gough writes "unfortunately the regiſter of the pariſh does not begin till 1570, which is ten years after the time of the next ſucceſſor noticed in Brydges' liſt of the incumbents, and Helmdon church having been completely new paved," Mr. Gough looked in vain for any ſepulchral veſtige of him. Should his will be diſcovered it may afford ſome material intelligence concerning him. At preſent there is a ſtrong preſumption of his having built the rectory-houſe; and after duly weighing the ſeveral circumſtances alledged to eſtabliſh the early uſe of Arabic numerals from the Helmdon date, I ſcruple not to plead that it ought to be ſtruck out of the record. It being alſo undeniable that as the Arabic numerals on the outbuildings at Preſton Hall could not have been carved before the concluſion of the ſixteenth century, there muſt be in them a retroſpective alluſion to the date of the year, and conſequently this is another caſe not in point. The unknown quaint writer in Bibliotheca Literaria, together with other critics leſs eccentric, have diſmiſſed the Colcheſter date; and, if I am not miſtaken, there is not a ſingle inſcription produced in the controverſy that has not been diſallowed as being indefenſible

by very intelligent and unbiaſſed antiquaries. May I not then ſafely venture to again advance, that there has not been a well authenticated inſcription on wood, ſtone, or metal, yet diſcovered with Arabic numerals of an earlier period than 1454, and that denoting on a braſs plate in Ware church the death of Ellen Wood, and Mr. Gough tells me, that on another braſs plate in the ſame church over the remains of Mr. Bramber, who there founded a chauntry chapel, there is the date of the year 1484 in the ſame numerals.

The earlieſt uſe of theſe characters in ſpecifying the dates of deeds, and in numbering the leaves or pages of books in MS. is another proper object of inquiry. Againſt the repeated aſſertions of Dr. Harris, in his Hiſtory of Kent, that they were thus originally employed by the compiler of Textus Roffenſis, I declined offering myſelf as an evidence, from not having ſeen that curious book upwards of twenty years, and from my not having ever conſulted it for the purpoſe of aſcertaining this point. I therefore chiefly relied on the opinion of Dr. Pegge, who had ſeen it, and who had procured a collated copy, only ſuggeſting the great improbability there was of biſhop Ernulf's having ſo frequently uſed theſe vulgar figures in marking the leaves without having ſuffered any of them to ſlip by accident into the text itſelf. But I ſhall now ſubjoin a clear and full report given by the archdeacon of Rocheſter, who, with Mr. Wrighte, our ſecretary, has, at my requeſt, lately examined the book. "We are both (writes Dr. Law) decidedly of opinion, that the figures on the top of the pages are modern. I ſhould not have preſumed to adduce my teſtimony, if there could be a doubt of the recent inſertion of the above figures. Mr. Wrighte took a fac ſimile of the numeral characters at the beginning of the book, which is now conveyed to you. I am amazed that any one who ever inſpected the Textus Roffenſis could ſuppoſe the numerals

merals at the top of the pages coeval with the work itſelf. Inſpection ſatisfied me, and the Arabic numerals not being once read in the book."

Mr. Henry Ellis, a very young ſtudent of St. John's College in Oxford, who has a ſtrong and an uſeful propenſity to antiquarian reſearches, has found in a leaf of a MS. of *Trivet Super Ovidi Metamorphos*', in the library of that college, in an old hand, this entry.

" Libér quondã Magri. Thome Egburhab. M. Rob. Elyot A° Doi 1ᵒ⁸ᴧ1 (1471) dat' ad ſit q. nõ vendat'r poſt ejus mortem, &c. Orate qu. p. añ'a ejs." The remark of Mr. Gough, who communicated to me this extract, is, that it will at leaſt make Arabic numerals in MS. keep pace with the ſpecimens on braſſes. And in the Introduction to Sepulchral Monuments, Vol. II. pp. cclix, cclxi, are the following pertinent obſervations on this ſubject.

" They appear in Bacon's Calender written about 1292 (Aſtle. p. 188, 189). They were at firſt rarely uſed, except in mathematical, aſtronomical, and geometrical works. They were afterwards admitted in calendars and chronicles, and to date MSS. but not introduced into charters before the ſixteenth century; the appearance of ſuch before the fourteenth would invalidate their authenticity. In the fourteenth and fifteenth they may be ſometimes found, though very rarely in the minutes of notaries. Theſe exceptions, ſhould they be diſcovered, would only help to confirm the rule that excludes them from appearing in inſtruments, previous to the ſixteenth century. If there wanted any deciſive proof of the improbability of the Arabic numerals having been common among us before the fifteenth century, one might deduce a weighty argument from their not appearing on ſepulchral monuments till about the middle of the fifteenth century. Mr. North, in a ſenſible paper addreſſed by him to Mr. Folkes, and afterwards to his ſucceſſor the earl of Morton, and communicated to the Society of Antiquaries, after I bought it

among the papers of his friend and executor Dr. Lort, has proved they were not diſcovered by Gerbert, nor uſed in Spain, nor introduced before the time of biſhop Groſſeteſte, who died in 1253, after John Baſing, the archdeacon of Leiceſter brought them from Greece between 1235 and 1240[*c*]."

The paſſage in Matt. Paris's hiſtory, cited by Mr. North, with his comment, ought to have a fuller inquiry, becauſe, from a miſinterpretation of it, he ſeems to have attributed to the archdeacon of Leiceſter the introduction of Arabic numerals into England.—It is as follows.

" Hic magiſter Johannes figuras Græcorum numerales et earum notitiam et ſignificationes in Angliam portavit, et familiaribus ſuis declaravit, per quas figuras etiam literæ repreſentantur. De quibus figuris hoc maxime admirandum quod unicâ figurâ quilibet numerus repreſentatur: quod non eſt in Latino vel in Algoriſmo [*d*]."

It being expreſsly mentioned that John de Baſing imported into this country the Greek numerals, is it not an overſtrained critical amendment to aſſert that the characters were not Greek, but Indian numerals, and new named by ſome uncertain continuator of the hiſtory, becauſe they paſſed from India through Greece to England? Such a fundamental alteration will be deemed leſs juſtifiable, if it be conſidered, that the perſon in queſtion was the moſt eminent Greek ſcholar of his age; that he travelled into Greece and abided at Athens, for the purpoſe of improving himſelf in the Greek language. That when he returned home he brought with him ſeveral Greek MSS; that he ſpirited youths to the ſtudy of the Geeek language; and that for the uſe of the ſtudious he tranſlated into Latin an edition of a Greek grammar. Nor from the relation we have of him does it appear that he extended his travels beyond Athens, or that he was converſant in the eaſtern literature and

[*c*] Archaeologia, V. X. p. 375.

[*d*] p. 721, Edit. Watts.

ſciences

ſciences. We learn, however, that he communicated to his intimate acquaintance the knowledge and the ſignifications of theſe figures; and from the brief explanation given of them by the hiſtorian, who has likewiſe contraſted them with two other kinds of numerals, it may, I think, be demonſtrated that he muſt have meant the Greek figures. This, obſerves the hiſtorian, was the thing moſt to be admired in them, that by a ſingle figure any number is repreſented, a poſition that a paſſage in the Appendix to the Lexicon by Scapula, p. 232, has a tendency to illuſtrate.

" De Græcorum notis Arithmæticis compendium ex Hadriani Amerotio Scriptis,

Græci utuntur notis numerorum literis alphabeticis; idque tribus modis. Primo ſingulis elementis ſecundum alphabeti ſeriem loci ſub numerum ſignificantibus. Nam quorum in ordine alphabeti locum quæque litera ſortita eſt, ejuſdem numerum repreſentat, ut *a* primum, *c* ſecundum, et ita deinceps uſque *W.* quod 24 ſymbolum habet." But, continues the hiſtorian, this is not the caſe with the Latin numerals, *non eſt in Latino*; and the difference is obvious, there being no more than ſeven Latin letters uſed, viz. M. for a thouſand; D. for five hundred; C. for one hundred; L. for fifty; X. for ten; V. for five; and I. for units; ſo that there are ſeven of the firſt ten numbers not noted by a ſingle figure, or letter. Matt. Paris concludes with remarking, *vel Algoriſmo*, or in Algoriſm; clearly contraſting the figures he had before deſcribed with a third claſs. To make what he calls the Greek letters the ſame with the characters in Algoriſmo is to ſuggeſt a diſtinction without any difference: and Algoriſmus is a word agreed by the gloſſariſts to be of Arabic etymology, and to denote numbering; and therefore Arabic figures muſt be here meant, which primâ facie cover only nine figures; the o being a mere cypher, without any ſignification, except from its relative poſition to the other characters.

racters. Evident then is it that the Arabic numerals were known to the hiſtorian, though it may be reaſonably inferred that he was not aware of their amazing capabilities. Had he had a notion of theſe extenſive powers, he could never, as figures, have given a preference to the Greek letters. As changes of millions, ad infinitum, can be ſo eaſily rung, if I may be allowed the expreſſion, on theſe ten arithmetical marks, he muſt have ſeen that they were the moſt admirable.

Mr. North urges the ignorance of the Arabians againſt the notion entertained of the characters called after their name having originated with them, and offers as a proof of it the remarkable piece of hiſtory cited in the ſecond year of the emperor Juſtinian, their then wanting cyphers to denote one, two, and three, and eight and a half. If in the year 566 the knowledge of theſe people was really ſo limited, it will not follow that the Arabians, even in their own country, had not made the ſmall improvement of completing the number of cyphers to ten in the four ſubſequent centuries. But in the territories which the Saracens conquered their progreſs in literature was aſtoniſhing, and to them principally were the Europeans indebted for the cultivation of arts and ſciences.

In pp. 373, 374, of the ſame article, Mr. North mentions his having ſeen in Benet Coll. Library a MS. with Arabic numerals, that contained a table of eclipſes from the year 1330 to 1348, and there being prefixed an account of numbers and the manner of expreſſing them. To this account I ſhall again refer, after examining another MS. communicated to me by Mr. Gough, in which there are tables and delineations of eclipſes for fifty-ſix years of the fifteenth century in ſucceſſion. This MS. compriſes a very copious calendar of the twelve months, and ſeveral of the columns in every month have Arabic numerals only.

Eclipſes, ſolar and lunar, are exhibited from 1406 to 1462, both years

years incluſive. The phaſes of the ſun and moon are neatly illuminated with colours of gold and azure, the part eclipſed being azure; and above each phaſis the year in Arabic numerals is marked with a pen. Towards the end of the book there are five pages with memoranda aſtronomical and aſtrological concerning the ſeveral months. The ſigns of the zodiac predominant are noticed with their ſuppoſed influence upon perſons and things, and under each month the days are ſpecified when flebotomy was to be avoided. Theſe precautions are thus ſummed up at the concluſion of the year, " Et in toto ſunt 33 [*e*] dies in quibus cavendum eſt a flebot' ſicut p̃notatū eſt de menſe in menſem." Then is given this other warning: " Iſti ſunt dies mali obſervandi ab inciſione in anno, et qui homines vel pecora inciderint inde morientur [*f*]."

The

[*e*] There is an error in the computation: the total not being 33, but 34, as is plain from the underwritten items.

January	8	April	3	July	2	October	1
February	3	May	4	Auguſt	2	November	2
March	3	June	1	September	2	December	3

Why it was judged expedient to proſcribe ſo many as eight days in January, and one only in June and October, no reaſon is aſſigned.

[*f*] The Mali Dies were

Oct. Kal. Novembr'	-	(Octr. 25. Criſpin Martyr.)
Prima dies Auguſti	-	(Lammas Day.)
Ult. Kal. Decembr'	-	(Novr. 14.)

Why the feſtival of Criſpin and Lammas Day had the black mark ſet upon them ſhall be ſubmitted to the ſurmiſe of others. But Ult. Kal. Nov. may have been deemed inauſpicious, becauſe ſol fuit in ſaggittario, and, as obſerved under that month, " Sagittarius ſubito mittit ſagittas." In 'the Myrrour, or Glaſſe of Helth,' publiſhed A. 1543, (Typographical Antiq. Vol. I. p 375,) it is noticed on the back of a leaf, " Theſe bene the thre perylous Mondayes in the yeare to let bloud, to take any medicyne, or purgation—The firſt Monday of Auguſt. The ſecond is, the laſt Monday of April. And the thyrde is the laſt Mondaye of December." But if it were an

object

The next paragraph, and the laſt in the page, is, " Nota quod quelibet figura algoriſmi in primo loco Signt ſe ipſam, et in ſecundo loco decies ſe. Tertio loco centies ſe ipſam. Quarto loco milleſies ſe. Quinto loco decies milleſies ſe. Sexto loco centies milleſies ſe. Septimo loco mille milleſies ſe. Octavo loco decies mille milleſies ſe. Nono loco mille mille milleſies ſe. Et ſemp. incipiendum eſt computare a parte ſiniſtra more judaico." The ſucceeding page contains the Latin and Arabic numerals from 1 to 100, the vulgar figures of each number being placed directly beneath the Roman letters. And in the next, which is the laſt page of the book, there are in the firſt column many numbers from twenty to a million; thus ſpecifying each number by Latin words, Roman numerals, and Arabic figures——Viginti—XX—20, &c. Mille Milia Mc Ma—1000000.—The other column contains Arabic numerals only from 1 to 100—and from 10000 to 100000.

A perſon more converſant than myſelf in ancient almanacks might preciſely fix the year when this calendar was written, in which attempt I frankly own I have failed. But thinking it unlikely that the computiſt ſhould have calculated and diſplayed eclipſes that had paſſed, and obſerving that the eclipſes of both ſun and moon in 1406 were the firſt ſpecified, my ſurmiſe is that the MS. is not of an earlier period than the fifth year of the fifteenth century. And it is proper to repeat that the year of each eclipſe is marked with Arabic numerals, though ſuch coetaneous annual

object to ſave the expence of embalming, of all the days and nights in the year the moſt lucky for coming into the world would have been the 5h of the kalends of April, and the ides of Auguſt, it being prognoſticated in the calendar belonging to Mr. Gough, that the bodies of the perſons born on thoſe days or nights would never be liable to putrefaction.—" Julius—et ſunt duo dies et noctes in anno, in quibus ſi quis natus fuerit, nunquam putrifiet uſque in diem judicii."

dates

dates in theſe characters are ſo ſeldom to be met with in other books; nor, as I believe, has any charter been yet adduced thus dated in the preceding century[g].

With reſpect to the notes on the ſeveral months in the laſt leaves of the book, and the brief explanation of the figures in Algoriſm, they appear to have been written ſome years after the calendar was compiled; and this opinion is adopted partly on the colour of the ink, which is very different from that of the calendar, and of almoſt all the ſubſequent pages, and partly on the form of

[g] In a letter from Mr. H. Ellis, of St. John's College, Oxford, dated Feb. 12, 1797, are theſe paſſages relative to Arabic numerals in a calendar, and in an ancient deed.

"In MS. Rawlin, 1°. p. 811, are two ancient calendars on vellum, one in Roman the other in Arabic numerals, which are beautifully expreſſed in blue and red. At the bottom of one of the pages is in a fair hand,

"Orate p. aiãb, Rĩci ffuller capellani et Rĩci Aleyn
"Kervr̃ qui dederunt hunc librum Eccl̃ie be Marie
"Virginis de Bury S̃ci Edmundi Anno d̃m 1ᴿᴧ2."—(1472).

In the next place I ſhall mention ancient deeds, though you will not find that to be a prolific article. Yet in ſearching for materials for this letter, I carefully examined ſeveral large folios of ancient charters in Dr. Rawlinſon's collection of MSS. at the Bodleian, and I am ſorry to add that I was rewarded with one inſtance only, viz. MS. Rawlins, 1329, at the 11th folio of which is a ſmall charter beginning

"Sciant p'ſent' & futuri quod ego Wills de tonges dedi conceſſi et hac p'ſenti carta mea confirmavi Willo fil' Willi le Frenche unã plac' terr' in villa de Meliſon, &c. &c. Dat. apd Welynton die mercur' px. poſt f̃m S̃ci Auguſtini Anno 1717 ♁ tertii a c̃queſtu̇ quarto." If it be 4 H. 3 it ſhould be 1120 inſtead of 1217.

The ſeal is gone.—The figures I conjecture are meant to expreſs the year 1414, but ♁ tertii, &c. is at preſent unintelligible to me."

The following is communicated by Mr. Gough. "In an almanack and prognoſtication for the yeare of our Lord MV & XLVIII, by M. Alphonſus Laet, brother of M. Jaſper Laet, imprynted at London (the printers name torn off) all the numerals are Arabic, except the Golden Number, cycle of the ſun, Indictio Romana, and calculation of a lunar eclipſe. Perhaps this may be one of the firſt printed calendars."

the letters, and on abbreviations. This ought however to be more cloſely examined, and if poſſible determined, in order to aſcertain the knowledge, though not the uſe, of the Arabic numerals at that period. In the account prefixed to the calendar of the fourteenth century, referred to by Mr. North, there is added a paragraph ſtill more explicit of the threefold diviſion of numbers into digits, articles, and compound or mixed. Record's deſcription cited in my letter to Mr. Gough has rendered into Engliſh a ſimilar paragraph; and it ſeems to merit a reſearch *which* may be the earlieſt MS. in Latin in which this elucidation of the Arabic numerals occurs, and whether a tranſlation of it is to be found in any book previous to the introduction of printing.

But ſince it is clear that Arabic numerals were not unknown to Matt. Paris, how are we to account for Chaucer in his Dreme ſtyling them *newe* figures? The probable ſolution of this difficulty is, that theſe figures ten had been then but lately uſed for the addition and ſubtraction of pounds, ſhillings, and pence; and the ſurmiſe acquires weight from the concomitant words of the poet, that "Argus, the noble countour, counted with them in his countour." And yet proof is wanting of this uſe of the vulgar figures from the time of Chaucer to an advanced period of the ſixteenth century. In books (writes Mr. North) they were doubtleſs firſt uſed, and books have been examined to no purpoſe. Imagining that though the ſearch had been fruitleſs in the libraries of ſeveral colleges in Oxford, ſome examples might be traced in the books of accompts upon the ſhelves and in the boxes of the Burſar's apartments, I hinted a wiſh to Mr. Ellis to purſue, when quite convenient, this *new* line of inquiry. He willingly acceded to it, and this is the reſult of his examination.

"In the enumeration of thoſe colleges whoſe burſary accounts you wiſhed me to ſearch, Merton (the moſt ancient Society) appears

pears to have eſcaped your memory. The warden, Dr. Berdmore, upon my application, received me with great politeneſs; he told me that as for the burſary accounts, thoſe of an early date were in Roman numerals, but that I ſhould ſee an old volume of the college regiſter, at the top of every page of which the date of the year appears in Arabic numerals; the earlieſt 1482.

" The old burſary accounts of All Souls begin 1446, but the Roman numerals are uſed till the beginning of the preſent century, when figures are totally excluded, in the ſeparate charges of each article, and retained only in caſting up the ſum at the bottom of the page.

" The court-rolls preſerved in the archives of the ſame college are written with *Roman*, but many of them indorſed with the date of the year in *Arabic* numerals; the earlieſt thus marked was

" A° dni 48 uſque ad 49." i. e. 1448 to 1449.

I queſtion, however, whether they were ſo marked before 1470, as till about that time the rolls appear to have been thus indorſed by the ſame hand.

" Profeſſor Wallis, in his aſſertion that Arabic numerals appear to have been generally uſed for more than four centuries, does not appear to have judged from the burſary or other accounts of Exeter College, as is evident from the regiſters and books of accounts of that Society, which the rector freely permitted me to inſpect. The pecuniary *charges* and *diſcharges* in the old burſar's books are made in Roman numerals, which were not changed for the now vulgar figures till within the remembrance of the preſent warden about thirty years ago. In the rector's accounts of the ſame college, the *Roman* were altered for the *numerals now in uſe* on All Saints Day, Nov. 1, 1603; the vulgar figures ſeem to have been

uſed before in adding the ſums total at the foot of each page, the firſt inſtance of which occurs in 1594.

" In the regiſter of the election of Fellows into this college the Arabic numerals were introduced much earlier, viz. in 1539.

" Of the other college accounts I have only to report that none have occurred wherein the Arabic numerals are uſed till within the laſt fifty or ſeventy years, ſo that my inquiries in this line are now at an end."

Mr. North was of opinion that " it is not an uſual thing, or in any degree probable, that men ſhould loſe the uſe of what rendered their calculations ſo ſhort and facile, which with the numeral letters could not but be tedious and operoſe [*h*]." And yet we ſee during how long a continuance the numeral letters maintained their ground, notwithſtanding the *delay*, the *trouble*, and the *miſtakes*, that an adherence to them muſt have occaſioned. In the Hiſtory of Dean Colet, (Appendix, p. 334) Mr. Knight ſubjoins to a detail of the rents and profits of the eſtate belonging to the founder of St. Paul's School this remark, which is equally applicable to many long accounts entered in Roman numerals: " The caſting up of ſums is not always exact in originals, and for theſe errors it is not difficult to aſſign an adequate reaſon."

From the uncertain era of the firſt caſting up of pounds, ſhillings, and pence, in the now common figures to the cloſe of the ſixteenth century, it may be preſumed that in ſo long an interval the citizens [*i*] and merchants of London muſt have acquired on inconſiderable knowledge of what John Dee terms *the might of the Arabic figures*, eſpecially after the circulation from the preſs of

[*b*] Archaeolog. V. X. p. 363. + (h. 2.) See note after *r* at p. 3.

[*i*] All the " Aſſizes of Bread" printed in the ſixteenth century have the Roman numerals, and they were continued with the black letter through the ſeventeenth to 1714." R. G.

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ſundry treatiſes on Arithmetick. But I ſuſpect it will not be an eaſy thing to prove that they availed themſelves of the uſe of them in their *Day Books* and *Ledgers*; for having propoſed a ſearch to Mr. Gough, the anſwer to his inquiries was, that moſt of the merchants and corporation books were conſumed in the fire of London. However, in a miſcellaneous parcel relating to paper marks and Arabic numerals in Dr. Lort's collection, there was found a ſheet, containing ſeveral charges incident to a ſhip navigated from Africa to England in the year 1603, in which the pages referred to in another book are marked in the vulgar figures, as are alſo the ſums of money diſburſed in columns properly arranged, the items ſpecifying the charges being written in the Latin numerals in the middle of the page. This correſponds in ſome degree with Record's explanation by the Roman letters of the value of the vulgar figures in his chapter of Numeration, and it might be owing to this mode of teaching that this needleſs twofold entry was ſo long practiſed.

Record, in his Preface, mentions treatiſes in Engliſh on Arithmetick that were written before his book appeared, and on examining Typographical Antiquities I diſcovered *three*, if not *four*, on this ſubject. Notes of, as it is believed, almoſt all the treatiſes publiſhed from the time of the introduction of printing by Caxton, to the year 1600, are conveyed with this paper. Perſons who are luckily poſſeſſed of theſe treatiſes (ſome of which are ſcarce) may poſſibly be able to collect from them remarks hiſtorical and illuſtrative. With an exception to Record's book, I can form no other judgment than from the title pages, with Herbert's Summary of the contents of each treatiſe. The evidence thus afforded ſhall be ſtated, and the concluſions that may be deduced from it.

In the "Ymage or Mirrour of the Worlde," tranſlated from the French by Caxton, and printed by him A. 1480, the tenth chapter

ter is intitled " of *Arſmetrike*, and whereof it procedeth." Herbert, who ſuppoſes Laurence Andrew to have practiſed printing in 1527, notices a book from his preſs, in which " *Arſmetryke* wyth the maner of accountes and rekenynges by Cyfres" is mentioned; and Lewis, in Life of Caxton, p. 26, calls this another edition of the book printed by Caxton.

A. 1537. John Hertforde printed in the Abbey of St. Alban's " an Introduction for to lerne to reken with the pen, and with the counters after the true caſt of Ariſmetyke, or *Awgrym*, in hole numbers, and alſo in broken;" and at the concluſion it is ſuggeſted [*k*], " Thus endeth the Scyence of *Awgrym*, the wich is newly corrected out of dyvers bokes, becauſe that the people may come to the more underſtandynge and knowlege of the ſayde arte or ſcyence of *Awgrym*."

Theſe terms are thus explained by Record, after a hint given by the maſter to the ſcholar: " What great rebuke it were to have ſtudied a ſcience, and yet cannot tell how it is named." " Both names, *Arſemetrick* and *Augrime*, are corruptly written. Arſmetrick for Arithmeticke, as the Greeks call it, and Augrime for Algoriſme, as the Arabians found it, which doth betoken the ſcience of Numbering[*l*]."

A. 1543. Hugh Oldcaſtle, ſcholemaſter in St. Ollave's pariſh in Mark Lane, ſet forth the " Treatiſe according to which he there taught Arithmetike." This was reprinted by John Windet in 1588, under the title of " A Briefe Inſtruction to keepe Bookes of Accomptes." And I imagine John Mellis to have been the " reneuer and reviver of this auncient copie," it being advertiſed that

[*k*] The Introduction, &c. printed A. 1595, by Ja. Roberts, ſeems to have been an improved edition of this Treatiſe.

[*l*] Record's Arithmetick, edit. 1658, p. 7.

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he added "A Short and Plain Treatiſe of Arithmetike compriſed in a briefer method than hetherto had bin publiſhed." Another edition of this briefe Introduction with additions, and a variation in the title page, was publiſhed in 1588.

A. 1549. Robert Recorde, Doctor of Phyſick, publiſhed "The Grounde of Artes, teaching the Woorke and Practice of Arithmetike, booth in whole numbers and fractions, after a more eaſyer and exacter ſort, than any lyke had hitherto been ſet forth." The firſt Preface was addreſſed to the moſt Myghty Prince Edward, the Sixte King of England, &c. And a ſecond Preface to the loving Readers. For though, as he writes, "Unto the King his Majeſty privately I doe it dedicate, yet I doubt not (ſuch is his clemency) but that he can be content, yea, and much deſirous, that *all* his loving ſubjects ſhould take the uſe of it, and employ the ſame to their moſt profit." In 1558, there ſeems to me to have been a ſecond edition of this treatiſe, and the ſecond preface addreſſed, not to readers in general, but to Mayſter Rycherd Whalley, Eſq. But there cannot be a doubt of there being an edition in 1561, ſuggeſted to be now of late *overſeen* and *augmented* with new and neceſſarie additions. J. D. is a ſignature uſed in this title page, probably the initials of John Dee [*m*].

1557.

[*m*] Mr. Herbert, in his Typographical Antiquities, p. 600, in the margin, aſſigns A. 1549 for the date of the edition of Record's Ground of Artes, but concludes the line with A. 1561, from inadvertency as I apprehend.

There muſt have been an edition before 1551, as the book was dedicated to King Edward VI, who died in that year; and as Mr. Herbert notices an edition in 1558, if there were one in 1561, it muſt have been a third edition.

Of the edition in 1558 he remarks, that this ſeems to be the firſt edition teaching Fractions; a ſurmiſe that does not appear to be well founded, ſince his book previouſly publiſhed would on ſuch a ſuppoſition have been leſs uſeful than the treatiſe written by Hugh Oldcaſtle, and publiſhed in 1543, or than that printed by Hertford at St. Alban's

1557. John Kingſtone printed "The Whetſtone of Witte, or a ſecond part of Arithmetike compiled by Recorde," and which he dedicated to the Governors, Conſulles, and the reſte of the companie of Venturers into Muſcovia.

A. 1562, was firſt publiſhed, for there have been ſeveral editions of the treatiſe, "The Well Sprynge of Sciences, which teacheth the perfect Woorke and Practiſe of Arithmetike, &c. by Humfrey Baker, citizyn of London," and it was dedicated by him to Maiſter John Fitzwilliam, Governour of the moſt famous Societie of Marchchauntes Adventurers into Flaunders, &c. A. 1576-7, a licence was granted to William Norton and John Harriſon to print "Dionis Gray, of London, Goldſmith, his Storehouſe of Brevitie in Workes of Arithmetike, a work of rare pleaſant and commodious effecte;" and in 1586 there was another edition amended by the author.

A. 1591. Thomas Nelſon had a licence to print "The Pathwaie to Knowledge, teaching the perfect Worke and Practiſe of Arithmetick in whole numbers and fractions, both by pen and counters, &c. ſet forth by Nicholaus Peter de Daventer." And

A. 1592. Richard Field printed "Thomas Maſterton his firſt book of Arithmeticke, after a more perfect, brief, well ordered way,

Alban's in 1546, and reprinted by him in London; for theſe treatiſes "taught to recken with hole numbers or in broken." And under ſuch a defect, Record could not have flattered himſelf "that ſome would like his booke above any other Engliſh Arithmetick hitherto publiſhed;" as he ſuggeſts in the preface to the reader. Beſides he ſtyles his "Whetſtone of Witte," which was a ſubſequent treatiſe, "the ſecond part of Arithmetick, containing the extraction of Rootes."

To the treatiſe printed by Hertford was prefixed "A Cut of a Man placing counters on a table." To the edition of Record's Arithmetick, A. 1558, there was a cut of the Doctor ſitting at a table teaching Arithmetick to two men ſitting at the ſame table, and a third looking on.

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than any other heretofore publiſhed: Ve'rie neceſſarie for all men. Nothing *without* labour. All things *with* reaſon."

Notwithſtanding the circulation in print of the treatiſes above mentioned, which were to teach to reckon in a ſpeedier and more complete method than had been hitherto purſued, is there not ſcope for a conjecture whether the proficients were as numerous as might reaſonably have been expected under theſe advantages! The entries in the churchwardens books of accounts being made as far as yet has been traced in the Latin numerals, and indeed the very few ſpecimens now remaining of practical Arithmetick in the vulgar figures, afford a preſumptive proof in ſupport of the ſurmiſe. And it is further obſervable, that ſo late as the year 1595, perſons were taught to reckon with counters, moſt of them unqueſtionably becauſe they were illiterate; and probably it might be found on examination, that there were then very few ſchools eſtabliſhed, or encouraged by voluntary contributions, for inſtructing the children of the lower claſs of people in reading, writing, and cyphering [*n*].

Of

[*n*] By a ſtatute of the Grammar School founded at Sandwich, A. 1580, by ſir Robert Manwood, "Every ſcholler hereafter to be admitted to be hable before his admiſſion to write competentlie and to read perfectlie both Engliſh and Lattyne. Such as are already placed in the ſchole to attaine writing competentlie within one quarter of a yere next comminge, or elſe to attain the ſame." (Collections for Hiſtory of Sandwich, by William Boys, Eſq. p. 226.) But in a note the founder grants a further latitude and indulgence. "I do ordain when ſufficient place in the ſchool-houſe is more than to ſuffice the Grammar ſcholars, than one convenient perſon that can write well ſhall in the ſaid ſchool-houſe teach ſcholars to read and write; to be appointed by the mayor and jurates, and have a ſtipend yearlie of 4lb. And that during ſuch teaching no other perſon ſhall be permitted within the town to teach writing of Engliſh, unleſs licenced by the mayor and jurates." May not this be an unique inſtance of a prohibition and monopoly adapted to prevent the progreſs of youth in learning their native language? The founder muſt have meant by writing competentlie to write legibly, which can hardly be ſaid of himſelf, judging from the fac ſimile epiſtle publiſhed by

Of Grammar ſchools there was not a ſcarcity, " there having been more erected and endowed within thirty years before the Reformation, than there had been in thirty years preceding. So that, as Dr. Knight ſuggeſted, there wanted rather a regulation than an increaſe of *them* [*o*]." But not in any Grammar ſchool, as I ſuſpect, was the ſcience of Arithmetick a branch of the original inſtitution. A knowledge of the primary rules of it was not a previous qualification for admiſſion into them. What was required of a ſcholar expectant was " that he ſhould be able to rede and write ſufficiently his own leſſons in Latyn and Englyſhe [*p*]." Not any uſher or aſſiſtant was provided to teach this " Ground of Arts," or to ſupply to the ſcholar a cup out of this " Well Spring of Sciences :" nor was an hour in a week appropriated for this eſſential branch of erudition. This was an overſight in the eſtabliſhment of ſchools which at that time, and long afterwards, had its inconveniences. And, whatever may be the preſent uſage, it is within recollection that fifty years ago there were ſent from capital ſchools to the univerſity youths of good abilities, and not by any means wanting in grammar and claſſical learning, yet ſo little verſed in the vulgar figures as to be obliged to have recourſe to the maſter of a day-ſchool in the town for inſtruction in the four fundamental rules of Arithmetick.

Record, as an academic, muſt have diſcovered this omiſſion in the inſtitution of the Grammar ſchools in his days; and, as I apprehend, it was one deſign of his treatiſe to endeavour to obviate

Mr. Boys. Cyphering was not an art deemed a neceſſary acquiſition by ſir Robert, though to the young inhabitants of a Cinque Port, and of the pariſhes contiguous, one ſhould have imagined that ſome of the time appropriated for their inſtruction might have been as uſefully employed in figures as " in varying of Latin, practiſing exerciſes of Anthonii Progymnaſmata, or in pearcing ſome of the words of a leſſon." p. 230, 231.

[*o*] The Life of Dr. John Colet, dean of St. Paul's, p. 100. [*p*] Ibid. p. 124.

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the bad effects that had enſued from it. He *impreſſes* on the mind of his nominal ſcholar that "as without the art of numbering a man can do almoſt nothing, ſo with the help he may attain to *all* things." He expatiates "how much it will profit towards the acquiſition of all the ſciences," and urges "how neceſſary it is in every profeſſion and every employment." He particulariſes "muſic, phyſic, lawe, *Grammar*, philoſophy, divinitie, the armie," and ſets forth "in how many ways it is conducible for all private weales, for lords and all poſſeſſioners, for merchants and all other occupiers, and generally for all eſtates of men." After ſhewing its importance in *Grammar*, and in philoſophy, he thus quotes the authorities of Ariſtotle and Plato: "It is the ſaying of Ariſtotle, that hee that is ignorant of Arithmeticke, is meet for no ſcience. And Plato, his maſter, wrote a little ſentence over his *ſchool-houſe* door, Let none enter in hither (quoth he) that is ignorant of Geometry. Seeing hee would have all his ſcholars expert in Geometry, much rather hee would have the ſame in Arithmeticke, without which Geometry cannot ſtand [*q*]."

When William of Wykeham formed his two noble ſeminaries on a truly original plan, which was, as it is obſerved by his moſt reſpectable biographer [*r*], to train the members of them from the loweſt claſs of Grammar learning to the higheſt degree of the ſeveral faculties, it was not to be expected that he ſhould make Arithmetick a primary article. Arithmetick was then ranged in one of the higher claſſes of ſcience, and with Latin numerals was hardly attainable by a ſtripling at a Grammar ſchool. The working of a ſum in the Rule of Three, if that were one of the calculating ſuppoſitions then propoſed, would have long puzzled the

[*q*] Record's Arithmetick, p. 4, 5. The ſcholar replys at p. 6, "This art is ſo neceſſary for man, that (as I thinke now) ſo much as a man lacketh of it, ſo much he lacketh of his ſenſe and wit."

[*r*] The Life of William of Wykeham, by Robert Lowth, D. D. p. 177.

brighteſt Wykehamiſt in the upper form. Of this circumſtance the founder muſt have been apprized, as it may be fairly preſumed that he was an expert Geometrician; and whilſt improving himſelf in the art of Numbering, he might repeatedly have found cauſe to make the ſame complaint which the ingenious Aldhelm did to Hedda, a prelate of his ſee, that the long and intricate calculations bore ſo grievouſly upon him as to make him almoſt deſperate, and that the labour he had beſtowed on the other branches of learning he had attained was trifling in compariſon [*s*]. This will ſufficiently account for Wykeham's not ingrafting Arithmetick on Grammar in his ſchool at Wincheſter; and as Henry VI. was, at Eton and Cambridge, a ſtrict copier of Wykeham's plan, and as Arithmetick was then a ſcience of immenſe labour from the limited uſe of the Arabic numerals, it was an elementary mode of inſtruction that would have been then premature.

But in the ſixteenth century the caſe was materially altered. Of the power and the convenience of Arabic numerals there could not have been then a doubt, though they were but little uſed in conſequence of a pertinacious adherence to an old habit. Early in that century, if not in the fifteenth, a book in Engliſh was certainly publiſhed to teach the manner of accounting by cyphers; and in 1543 there was a ſchoolmaſter in London who taught to keep accounts after a book of his own compiling. The "Pathwaie" to the art of numbering being thus rendered ſmooth and facile, it muſt appear ſtrange that in two ſchools inſtituted for the

[*s*] Anglia Sacra, V. XI. p. 7, De vita Aldhelmi.

"De ratione vero calculationis quid commemorandum; cum tantæ ſupputationis imminens deſperatio colla mentis oppreſſerit; ut omnem præteritum lectionis laborem parvi penderem, cujus me pridem ſecreta cubicula noſſe credideram; et ut ſententia beati Hieronymi, dum ſe occaſio obtulit, utar, *Qui mihi prius videbar Sciolus, rurſus cæpi eſſe diſcipulus*; ſic quod tandem ſuperna gratia fretus, difficilima rerum argumenta et calculi ſuppoſitiones, quas partes numeri appellant, lectionis inſtantia reperi."

improvement

improvement of the ſons of citizens of a trading metropolis, both entruſted to the charge and government of ſocieties of merchants, and one of them founded by a mercantile company, not any care was taken that the boys ſhould be put in the road to ſo neceſſary an acquiſition; and, as I have underſtood, no proviſion for arithmetical knowledge was made in the original eſtabliſhments of St. Paul's and Merchant Taylors' Schools.

In endeavouring to ſupply ſo great an omiſſion Record was entitled to a conſiderable degree of merit; for though, as he confeſſed, "his Ground of Artes might be of ſmall aid to the learned ſort, it might be to the ſimple and the ignorant which needeth moſt, a good furtherance and mean to knowledge." Nor ought his coadjutor, John Dee, to be paſſed by without his ſhare of credit. To an improved edition of Dr. Record's book the reputed conjurer prefixed theſe ſtanzas:

"That which my friend hath well begun
For very love to common weal,
Need not all whole to be new done
But now increaſe I doe appeal.

"Something herein I once redreſt,
And now again for thy behoof,
Of zeal I doe, and at requeſt,
Both mend and adde, fit for all proof.

"Of numbers uſe, the endleſſe might,
No wit nor language can expreſſe:
Apply and try both day and night,
And then this truth thou wilt confeſſe."

And to the title page of a former edition, as it is believed, was ſubjoined

ſubjoined the following tetraſtic; which allowing it not to ſtrike out a ſpark of good poetry, emits a ray of ſome good ſenſe.

" All youth and elde that reaſon's lore
Within your breaſtes will plant to trade;
Of numbers might the endles ſtore
Fyrſt underſtand, then further wade."

Conformable to this rule of inſtruction was the opinion of Dr. Johnſon, as communicated by Mr. Boſwell [*t*]. He allowed very great influence to education. " I do not deny, ſir, but there is ſome original difference in minds; but it is nothing in compariſon of what is formed by education. We may inſtance the ſcience of *Numbers*, which all minds are equally capable of attaining; yet we find a prodigious difference in the powers of different men, in that reſpect, after they are grown up, becauſe their minds have been more or leſs exerciſed in it."

As this diſquiſition was opened, ſo it ſhall be cloſed, with the obſervation of the ſame learned and judicious writer, truſting that the intervening remarks may afford a little amuſement to the members of a Society, whoſe province it is to take care that not any lamp of ſcience ſhall ever be extinguiſhed [*u*], and to whom, with becoming deference, theſe ſcintillations of Arithmetick are addreſſed, by their faithful and humble ſervant,

Wilmington,
March 25, 1797.

SAM. DENNE.

[*t*] Life of Johnſon, V. II. p. 321.

[*u*] *Non Extinguetur.* Motto to the ſeal of the Society.